AXON

Media Server with Collage™ Software

User Manual

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HIGH END SYSTEMS®

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Patents

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US 4,392,187; US 4,602,321; US 4,688,161; US 4,701,833; US 4,709,311; US 4,779,176; US 4,800,474; US 4,962,687; US 4,972,306; US 4,980,806; US 5,010,459; US 5,031,078; US 5,073,847; US 5,078,039; US 5,186,536; US 5,209,560; US 5,278,742; US 5,282,121; US 5,307,295; US 5,329,431; US 5,331,822; US 5,367,444; US 5,402,326; US 5,414,328; US 5,426,576; US 5,430,629; US 5,432,691; US 5,454,477; US 5,455,748; US 5,502,627; US 5,506,762; US 5,515,254; US 5,537,303; US 5,545,951; US 5,588,021; US 5,590,954; US 5,590,955; US 5,640,061; US 5,647,662; US 5,691,886; US 5,702,082; US 5,728,994; US 5,758,955; US 5,758,956; US 5,769,527; US 5,769,531; US 5,774,273; US 5,788,365; US 5,794,881; US 5,795,058; US 5,798,619; US 5,806,951; US 5,812,596; US 5,823,661; US 5,825,548; US 5,828,485; US 5,829,868; US 5,857,768; US 5,882,107; US 5,921,659; US 5,934,794; US 5,940,204; US 5,945,786; US 5,953,151; US 5,953,152; US 5,969,485; US 5,980,066; US 5,983,280; US 5,984,248; US 5,986,201; US 6,011,662; US 6,029,122; US 6,048,080; US 6,048,081; US 6,054,816; US 6,057,958; US 6,062,706; US 6,079,853; US 6,126,288; US 6,142,652; US 6,142,653; US 6,172,822; US 6,175,771; US 6,188,933; US 6,208,087; US 6,219,093; US 6,220,730; US 6,241,366; US 6,249,091; US 6,255,787; US 6,256,136; US 6,261,636; US 6,278,542; US 6,278,545; US 6,278,563; US 6,288,828; US 6,326,741; US 6,327,103; US 6,331,756; US 6,346,783; US 6,421,165; US 6,430,934; US 6,459,217; US 6,466,357; US 6,502,961; US 6,515,435; US 6,523,353; US 6,536,922; US 6,538,797; US 6,545,586; US 6,549,324; US 6,549,326; US 6,563,520; US 6,565,941; US 6,570,348; US 6,575,577; US 6,578,991; US 6,588,944; US 6,592,480; US 6,597,132; US 6,600,270; US 6,601,974; US 6,605,907; US 6,617,792; US 6,621,239; US 6,622,053; US 6,635,999; US 6,648,286; US 6,664,745; US 6,682,031; US 6,693,392; US 6,696,101; US 6,719,433; US 6,736,528; US 6,771,411; US 6,775,991; US 6,783,251; US 6,801,353; US 6,812,653; US 6,823,119; US 6,865,008; US 6,866,390; US 6,866,402; US 6,866,451; US 6,869,193; US 6,891,656; US 6,894,443; US 6,919,916; US 6,930,456; US 6,934,071; US 6,937,338; US 6,955,435; US 6,969,960; US 6,971,764; US 6,982,529; US 6,988,805; US 6,988,807; US 6,988,817; US 7,000,417; US 7,011,429; US 7,018,047; US 7,020,370; US 7,033,028; US 7,048,838; US 7,055,963; US 7,055,964; US 7,057,797; US 7,073,910; US 7,078,869; US 7,092,098; US 7,119,902; US 7,161,562; US 7,175,317; US 7,181,112; US D347,113; US D350,408; US D359,574; US D360,404; US D365,165; US D366,712; US D370,080; US D372,550; US D374,439; US D377,338; US D381,740; US D409,771; AT E169413; CA 2142619; CA 2145508; CA 2245842; DE 22588.4-08; DE 621495; DE 655144; DE 69320175.4; DE 69322401.0; DE 69331145.2; DE 69525856.7; DE 69734744.3; DE 797503; DK 0655144; DK 1447702; EP 0475082; EP 0621495; EP 0655144; EP 0662275; EP 0767398; EP 0797503; EP 0969247; EP 1447702; ES 0621495; FR 0621495; FR 0655144; FR 0662275; FR 1447702; GB 2043769B; GB 2055842B; GB 2283808B; GB 2290134B; GB 2291814B; GB 2292530B; GB 2292896B; GB 2294909B; GB 2295058B; GB 2303203B; GB 2306887B; GB 2307036B; GB 2316477B; IE 0621495; IT 034244BE; 2005; IT 0621495; IT 0655144; JP 3495373; JP 3793577; NL 0621495; NL 0797503; NL 0969247; UK 0621495; UK 0655144; UK 0662275; UK 0797503; UK 0969247; UK 1447702;

Contacting High End Systems®

Sales Department High End Systems, Inc.
2105 Gracy Farms Lane
Austin, TX 78758 USA
voice:512.836.2242
fax:512.837.5290
Toll Free: 800.890.8989

Customer Service High End Systems, Inc.
2105 Gracy Farms Lane
Austin, TX 78758 USA
voice:800.890.8989
fax: 512.834.9195
toll free: 800.890.8989
email: support@highend.com

World Wide Web: http://www.highend.com

Declaration of Conformity

according to ISO/IEC Guide 22 and EN45104

Manufacturer's name: High End Systems, Inc.

Distributor's name: High End Systems, Inc.
Distributor's address: 2105 Gracy Farms Lane
Austin, Texas 78758 USA

Declares that the product

Product Name: Axon
Product Number: All
Product Options: All

conforms to the following EEC directives:

73/23/EEC, as amended by 93/68/EEC

89/336/EEC, as amended by 92/31/EEC and 93/68/EEC

Equipment referred to in this declaration of conformity was first manufactured in compliance with the following standards in 2005:

Safety: EN 60598-1: 1997
EN 60598-2-17; 1990
A1-A3: 1998
A13: 1999

EMC:

EN 55022

Conducted Emissions Class A
Radiated Emissions Class A
ANSI C63.4 Class A
FCC 47 CFR Part 15 Class A
VCCI V-1/2001.04 Class A

EN 55024

EN 61000-4-2 4/8kV
EN 61000-4-3 A1 3V/m
EN 61000-4-4 1kV/0.5kV
EN 61000-4-5 2kV/1kV
EN 61000-4-6 3 Vrms
EN 61000-4-11 >95%-0.5p, 30%-25p,>95%-250p

EN 61000-3-2 Class A
EN 61000-3-3

USA, Thursday, June 14, 2007
Kenneth Stuart Hansen, Compliance Engineer

Product Modification Warning

High End Systems products are designed and manufactured to meet the requirements of United States and International safety regulations. Modifications to the product could affect safety and render the product non-compliant to relevant safety standards.

Mise En Garde Contre La Modification Du Produit

Les produits High End Systems sont conçus et fabriqués conformément aux exigences des règlements internationaux de sécurité. Toute modification du produit peut entraîner sa non conformité aux normes de sécurité en vigueur.

Produktmodifikationswarnung

Design und Herstellung von High End Systems entsprechen den Anforderungen der U.S. Amerikanischen und internationalen Sicherheitsvorschriften. Abänderungen dieses Produktes können dessen Sicherheit beeinträchtigen und unter Umständen gegen die diesbezüglichen Sicherheitsnormen verstoßen.

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I prodotti di High End Systems sono stati progettati e fabbricati per soddisfare i requisiti delle normative di sicurezza statunitensi ed internazionali. Qualsiasi modifica al prodotto potrebbe pregiudicare la sicurezza e rendere il prodotto non conforme agli standard di sicurezza pertinenti.

Advertencia De Modificación Del Producto

Los productos de High End Systems están diseñados y fabricados para cumplir los requisitos de las reglamentaciones de seguridad de los Estados Unidos e internacionales. Las modificaciones al producto podrían afectar la seguridad y dejar al producto fuera de conformidad con las normas de seguridad relevantes.

FCC Information

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Important Safety Information

Instructions pertaining to continued protection against fire, electric shock, and injury to persons are found in Appendix D. Please read all instructions prior to assembling, mounting, and operating this equipment.

Important: Informations De Sécurité

Les instructions se rapportant à la protection permanente contre les incendies, l'électrocution, excessif et aux blessures corporelles se trouvent dans l'Annexe D. Veuillez lire toutes les instructions avant d'assembler, de monter ou d'utiliser cet équipement.

Wichtige Sicherheitshinweise

Sicherheitsanleitungen zum Schutz gegen Feuer, elektrischen Schlag, und Verletzung von Personen finden Sie in Anhang D. Vor der Montage, dem Zusammenbau und der Intbetriebnahme dieses Geräts alle Anleitungen sorgfältig durchlesen.

Informazioni Importanti Di Sicurezza

Le istruzioni sulla protezione da incendi, folgorazione, e infortuni sono contenute nell'appendice D. Si prega di leggere tutte le istruzioni prima di assemblare, montare e azionare l'apparecchiatura.

Informacion Importante De Seguridad

En el Apéndice D se encuentran instrucciones sobre protección continua contra incendios, descarga eléctrica, y lesiones personales. Lea, por favor, todas las instrucciones antes del ensamblaje, montaje y operación de este equipo.

Symbols

The following international caution and warning symbols appear in margins throughout this manual to highlight messages.

CAUTION: This symbol appears adjacent to Caution messages. Not heeding these messages could result in personal injury and/or damage to equipment.

WARNING: This symbol appears adjacent to high voltage warning messages. Not heeding these messages could result in serious personal injury.

Packaged Media Notice:

Any use of this product other than consumer personal use in any manner that complies with the MPEG-2 Standard for encoding video information for packaged media is expressly prohibited without a license under applicable patents in the MPEG-2 patent portfolio, which license is available from MPEG LA, L.L.C., 250 Steele Street, Suite 300, Denver Colorado 80206.

Warranty Information

Limited Warranty

Unless otherwise stated, your *product (excluding the lamp)* is covered by a one year parts and labor limited warranty. The lamp warranty for Christie projectors is 120 days or 500 hours whatever comes first. It is the owner's responsibility to furnish receipts or invoices for verification of purchase, date, and dealer or distributor. If purchase date cannot be provided, date of manufacture will be used to determine warranty period.

Returning an Item Under Warranty for Repair

It is necessary to obtain a Return Material Authorization (RMA) number from your dealer or point of purchase BEFORE any units are returned for repair. The manufacturer will make the final determination as to whether or not the unit is covered by warranty.

Any Product unit or parts returned to High End Systems must be packaged in a suitable manner to ensure the protection of such Product unit or parts, and such package shall be clearly and prominently marked to indicate that the package contains returned Product units or parts and with an RMA number. Accompany all returned Product units or parts with a written explanation of the alleged problem or malfunction. Ship returned Product units or parts to: 2105 Gracy Farms Lane, Austin, TX 78758 USA.

Note: Freight Damage Claims are invalid for fixtures shipped in non-factory boxes and packing materials.

Freight

All shipping will be paid by the purchaser. Items under warranty shall have return shipping paid by the manufacturer only in the Continental United States. Under no circumstances will freight collect shipments be accepted. Prepaid shipping does not include rush expediting such as air freight. Air freight can be sent customer collect in the continental United States.

REPAIR OR REPLACEMENT AS PROVIDED FOR UNDER THIS WARRANTY IS THE EXCLUSIVE REMEDY OF THE CONSUMER OTHER THAN THE LIMITED WARRANTY STATED ABOVE. HIGH END SYSTEMS, INC. MAKES NO WARRANTIES, EXPRESS OR IMPLIED, WITH RESPECT TO ANY PRODUCT, AND HIGH END SPECIFICALLY DISCLAIMS ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. HIGH END SHALL NOT BE LIABLE FOR ANY INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGE, INCLUDING LOST PROFITS, SUSTAINED OR INCURRED IN CONNECTION WITH ANY PRODUCT OR CAUSED BY PRODUCT DEFECTS OR THE PARTIAL OR TOTAL FAILURE OF ANY PRODUCT REGARDLESS OF THE FORM OF ACTION, WHETHER IN CONTRACT, TORT (INCLUDING NEGLIGENCE), STRICT LIABILITY OR OTHERWISE, AND WHETHER OR NOT SUCH DAMAGE WAS FORESEEN OR UNFORESEEN.

Warranty is void if the product is misused, damaged, modified in any way, or for unauthorized repairs or parts. This warranty gives you specific legal rights, and you may also have other rights specific to your locality.

What You Should Know About Copyright

The following FAQ can help you understand copyright laws and how they apply to content used with the Axon and DL.2 media servers.

By *Suzy Vaughan Associates* for High End Systems.

I want to use a film clip from "When Harry Met Sally" in a promotional piece advertising my services. What do I have to do to be able to do that?

First of all, you need to obtain permission to use the clip from its owners. The clip is considered intellectual property, just as though it were your car or some software code developed by and belonging to Microsoft. This is because the U.S. Copyright Act gave creators of literary works (which include books, films, television programs, art works, still photos and musical compositions and recordings) the right to sell or license these works and to make money from them for the period of the copyright.

But what about public domain material? I heard that lots of material is in the public domain and can be used for free.

Once the copyright runs out, the creative work falls into the public domain and can be used freely by anyone without payment or licensing. If the work is not public domain, it is considered literary property. The Copyright Act provides substantial penalties for copyright infringement ranging from $10,000 for accidental infringement to $250,000 for willful infringement. However, contrary to popular belief, there really is not that much material in the public domain so this approach will limit you creatively.

What if I want to use a clip in a public performance? It's not being filmed or taped. Surely I don't need permission for that?

Public gatherings require clearance whenever copyrighted data is projected to audiences, or for any use other than just personal viewing. Concerts, trade shows, industrial shows, parties and raves are all examples of public performance and permission must be obtained.

Suppose I want to use a still photo or a magazine cover or a television clip? Do I have to obtain permission for them too?

Yes, they are also copyrighted works, whose owners must grant a license for their usage.

Do I need any other permissions to use this material?

In many cases you do. You may need to obtain permission to use the appearance of actors who appear in the clip as well as pay the writers and directors of the film that your clip comes from.

What about music? I hear you can use 8 bars for free.

8 bars for free is a fallacy that has been passed around as a fact for a long period of time. However, it isn't true. Both musical compositions and records require licensing and payment.

What about High End Systems material included with Axon and DL.2 media servers? Do I have to clear that?

No. High End Systems has worked to provide clearance for the content that is provided with Axon and DL.2 media servers. Any materials you received directly from HES with the purchase of a new media server have already been properly licensed for your use in shows and presentations. That does not, however, license you to sell this content separately from High End Systems media servers. Also, please be sure that any new content you obtain from outside sources is properly cleared for public presentation.

This sounds really difficult and I don't know how to do it? What do I do to properly license copyrighted material?

You need to consult with a Content Clearing House or with a properly licensed Intellectual Property Attorney. Content clearinghouses are typically less expensive to work with and have well established industry relations that can result in cost savings. High End Systems uses and highly recommends Suzy Vaughan Associates. Suzy Vaughan Associates has 20 years of experience in clearing clips, talent, and music for use in any number of venues. Their clients include Barbara Streisand, Michael Jackson, and The Emmys among other shows.

You can obtain more information about Suzy Vaughan Associates' services by calling 818-988-5599 or emailing info@suzyvaughan.com. Their website is www.suzyvaughan.com. Suzy Vaughan is also an attorney specializing in intellectual property issues.

How much does it typically cost to license copyrighted material?

The answer depends entirely on what material you want to use and how you plan to use it. Prices can range from hundreds of dollars for photography content to thousands of dollars for a highly desirable film/video clip. Since price is content-sensitive, the best thing to do is to contact a clearinghouse like Suzy Vaughan Associates and let them find out for you.

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Chapter 13: Content Management Application (CMA)

A Content Management Application (CMA) running on an Axon media server or a computer connected through an Ethernet network gives you remote control of content, software and configuration management functions.

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Appendix A: DL.2 and Axon DMX Protocol

DL.2 fixtures and Axon Media Servers utilize the same DMX protocol except that DL.2 fixtures include channels for motion and camera control. This table describes the Standard, Dual and Single Protocol for DL.2 fixtures and Axon Media Servers.

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Chapter I:

Product Overview

This chapter describes features and specifications for the Axon Media Server and the Content Management Application (CMA) software.

Axon is a rack mounted unit housing the same media server found in the DL.2 Digital Light fixture from High End Systems. The built-in 32-bit **Graphics Engine** software utilizes Windows XP Embedded and DirectX application programming interface to provide extensive image control of up to three 3-D graphic objects.

Axon media servers use the DMX512 protocol to control digital media allowing you to position, scale, rotate, apply visual effects and color mix graphic objects. You can define up to three of these objects and then apply global effects to the composite image.

The **Content Management Application** (CMA) operates on Axon and allows you to upload, move and clone content files, configure fixtures, and upgrade software. Using the CMA, you can also perform the same functions remotely on multiple media servers over an Ethernet network.

Features

System

- Software based on Windows XP Embedded and DirectX technology
- Powerful Content Management and Configuration software can remotely manage multiple Axon and DL.2 media servers.
- Supports importing of custom content including: 3D objects, media files, still images
- Provides DMX512 and Art-Net capability
- Upgrades software remotely
- Includes a royalty-free stock digital art collection including over 1000 lighting-optimized files
- S-Video input
- On board DVD drive for copying content into the Axon Server as well as burning User content onto DVD/CD.
- Collage™ software included with graphics engine

Graphics Engine

- Simultaneous playback of three discrete media streams on separate 2D/3D objects
- Image Optimizing Controls let you adjust both Black Level and Contrast for each cue and for each image
- 30 Object parameters give you graphic controls for each individual media stream including:
  - A choice of multiple play modes and play speeds
  - The ability to define any segment of a video loop including Scrub capability
  - Multiple color mixing and visual effects that can be combined any way you choose
  - Variable Opacity to allow for crossfading or dissolves between media streams
  - Full control of image Rotation, Positioning and Scaling on X, Y and Z axes
  - Visual Modes that let you control black level and contrast to optimize content
  - Video input or camera capture you can apply to 2d/3d objects
- 35 Global parameters provide graphic controls to the composite image created by up to 3 media streams
  - Collage Generator™ technology configures multiple media server outputs to display a single image in arrays up to 8 x 8.
  - Curved Surface Support corrects for shape distortions that occur when you project onto surfaces that aren't flat.
  - Intensity overlays the opacity control to provide system-wide intensity level
  - Overall image Color Mixing applied to composite media stream image
  - Color Effects including edge colors allow for combined image color mixing
  - Multiple Mask selections with edge fading and strobe effects
  - Edge fading for creating montages
  - Keystone correction on output projection
  - Viewpoint controls provide ability to change viewing angle/perspective on images
- Multiple modes for synchronizing content playback on multiple media servers linked through an Ethernet network.

Content Management Application

- Available for Windows and Mac operating systems
- Communicates with other Axon and DL.2 media servers over an Ethernet network
- Uploads and downloads custom digital content to DL.2 fixtures
- Configures Axon and DL.2 media servers
- Updates software including content, applications, and operating system to Axon and DL.2 media servers.

Related Products and Optional Accessories

The following table lists related products and accessories available for the Axon Media Server. For more information, contact your High End Systems dealer/distributor (see *Contacting High End Systems*® on page ii.)

Part Description	Part Number
Wholehog 3 lighting console	61020001
Hog iPC lighting console	74020001
Male 5-pin DMX terminator	90404039
Heavy duty 5-pin XLR cable (10')	55050017
Heavy duty 5-pin XLR cable (25')	55050018
Heavy duty 5-pin XLR cable (50')	55050019
Heavy duty 5-pin XLR cable (100')	55050020

Chapter 2:

Setup and Configuration

Hardware setup includes mounting, connecting to power and Ethernet and DMX linking. Software setup includes launching the Content Management Application (CMA) and setting configuration options.

Hardware Setup

The following steps make up the hardware setup for Axon and are described in this section

1. **Unpack Axon Media Server**
2. **Install power cord cap if necessary for your location**
3. **Connect a monitor to the top DVI port and to power for accessing the Content Management Application (CMA). A DVI/VGA Adapter is supplied if needed.**
4. **Connect a monitor or other output device to the bottom DVI port and to power. A DVI/VGA Adapter is supplied if needed.**
5. **If you want to use the CMA from a remote computer or synchronize this server with other Axon and DL.2 units, connect to Ethernet link**
6. **Connect Axon to a DMX controller via DMX cabling or an Art-Net box on an Ethernet network.**
7. **Connect Axon to power**

Unpacking the Axon Media Server

Your Axon media server ships with the following:

- Rack mountable Axon unit
- USB Mouse
- USB Keyboard
- Power Cord
- Two DVI/VGA Adapters
- DMX Interface cable.
- Documentation CD that contains
  - — CMA application (Mac and Windows)
  - — User Manual in .pdf format
  - — Server software
  - — Recovery software image

High End Systems® assumes no responsibility for products that are damaged during transport. Return a product for repair in its original packaging.

Before sending anything to the factory, call your High End Systems dealer/distributor for a Return Material Authorization (RMA) number. The factory cannot accept any goods shipped without an RMA number.

Replacing a Power Cord Cap

Axon ships with an IEC power cord. Different locations (even within the same country) may require a different power cord cap to connect the server to a power outlet. Because of the variety of power cord caps used worldwide, High End Systems, Inc. cannot make specific recommendations for the power cord cap. Contact a local authority for the type of power cord cap needed. When installing the power cord cap, note that the cores in the mains lead are colored according to the following code:

- green and yellow = earth
- blue = neutral
- brown = live

Installing a Line Cord Cap - U.K. Only

In the United Kingdom, core colours in the mains lead of this equipment may not correspond with the colored markings identifying the terminals in the fixture's plug. In that case, install a line cord cap in accordance with the following code:

- Connect the green and yellow core to the plug terminal marked with the letter "E," or by the earth symbol ⏚ or coloured green, or green and yellow.
- Connect the blue core to the terminal marked with the letter "N" or coloured black.
- Connect the brown core to the terminal marked with the letter "L" or coloured red.

WARNING:
Class 1 equipment - This equipment must be earthed.

Vatic Fitter Heads Information - Danmark

Advarsel: Beskyttelse mod elektrisk chock.

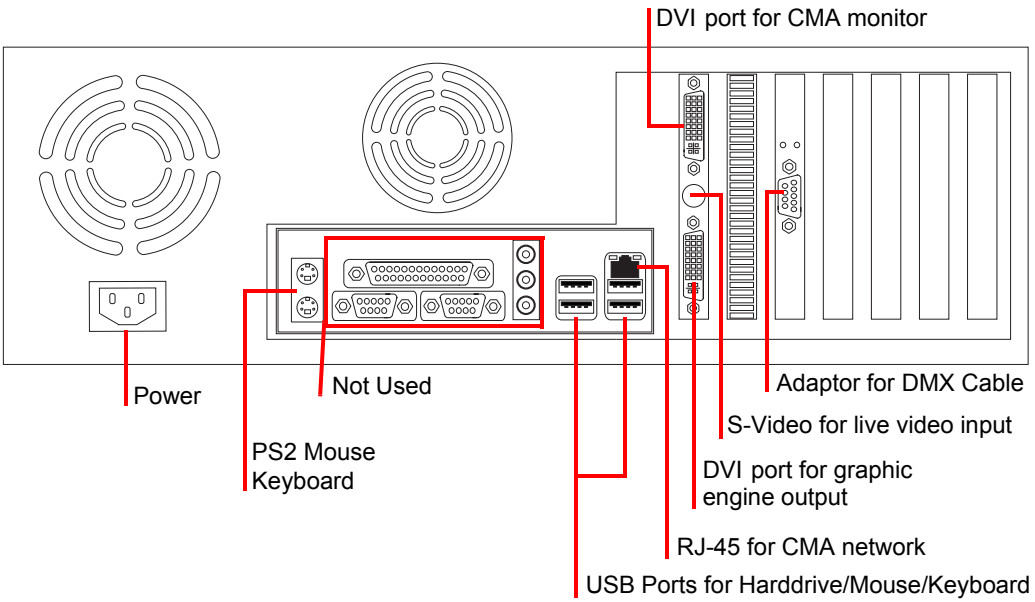
Vigtigt!

Lederne med gul/groen isolation maa kun tilsluttes en klemme maerket eller

Hardware Connections

The Axon back panel provides ports for:

- **5-pin DMX Data In and Data Out** (see *Setting up a Standard DMX Link* on page 8 for more information)
- **Ethernet** to connect to other Axon and DL.2 units and your computer running the Content Management Application (CMA) software on a fixture link (see *Using an Ethernet Link* on page 8).
- Four **USB** ports for connecting peripheral hard drives, flash drives, keyboard or mouse.
- Two **DVI** outputs on graphics card for connecting a monitor for startup and an output display device (another monitor, a Digital light, or a projector). Use **DVI to VGA** adaptors that shipped with your Axon unit.



Note: ***To initialize the graphic card ports, both DVI ports must have devices connected when starting the media server. When only one port is connected, it defaults to display the graphics engine output and will not display the CMA screen.***

Mounting the Server

The Axon media server mounts in any standard 3U rack.

Linking Axon

Setting up a Standard DMX Link

You can link Axon to fixtures on a standard DMX512 link using XLR cabling. The number of fixtures on a link is determined by the combined number of channels required by all the fixtures. The DMX channel range is determined by the protocol mode you choose.

- Standard Protocol (controlling up to three graphic objects) requires 149 consecutive channels
- Dual Protocol (controlling two graphic objects) requires 111 consecutive channels
- Single Protocol (controlling a single graphic object) requires 73 consecutive channels

Use data-grade cable and 5-pin XLR cable connectors. Data-grade cable is designed to carry a high-quality signal with less susceptibility to electromagnetic interference and less degradation over long distances. For cable and connector specification, see *Cable and Connector Specifications* on page 250.

Test each cable with a voltage/ohm meter (VOM) to verify correct polarity and to make sure that the negative and positive pins are not grounded or shorted to the shield or to each other.

CAUTION!
Do not connect anything to the ground lug on the XLR connectors.

Do not connect or allow contact between the common (cable shield) and the fixture's chassis ground. Grounding the common could cause a ground loop and/or erratic behavior.

To link one or more Axon servers to a DMX controller:

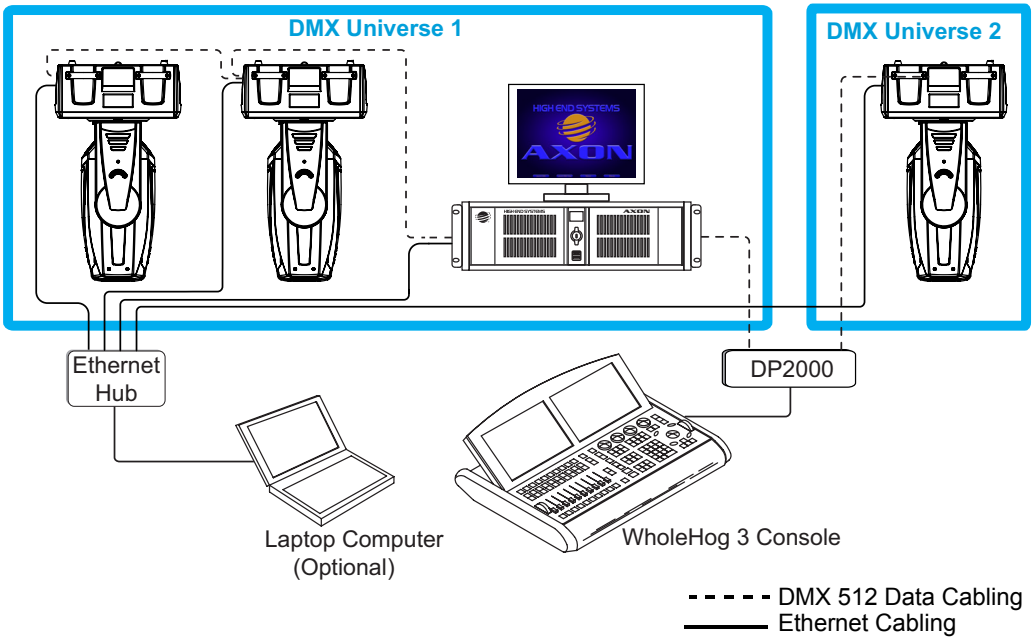
1. Connect the male XLR connector of a DMX Data cable to the controller's DMX Data Out connector.
2. Connect the Data cable's female XLR connector to the Data In connector of the first (or next) fixture on the DMX link.
3. Continue linking the remaining fixtures connecting a cable from the Data Out connector of each fixture to the Data In connector of the next fixture on the link.
4. Connect a terminator to the Data Out connector of the last fixture in the link (see *Powering On the Axon Server* on page 10). For information on obtaining a terminator, see *Related Products and Optional Accessories* on page 4. You can construct a terminator according to the specifications listed in *Cable and Connector Specifications* on page 250.

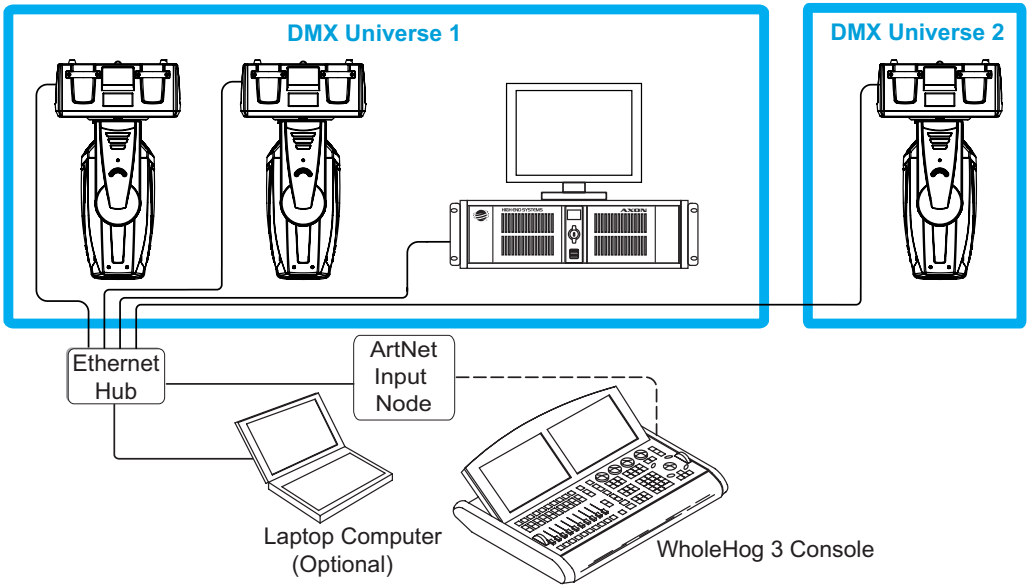
Using an Ethernet Link

Connecting multiple media servers to a common Ethernet network allows you to use the CMA to remotely manage content uploads and configuration for all the linked servers. An Ethernet link is also required if you want to synchronize playback between media servers. If you are using a DMX console and other automated lighting products compatible with Art-Net, an Ethernet network can also serve as the link for DMX control.

Linking Configurations

The following diagrams show configuration options for linking Axon media servers and DL.2 fixtures to each other via Ethernet. The laptop shown is optional since the CMA can be accessed directly on any Axon server on the link.





Powering On the Axon Server

WARNING:
This equipment is designed for connection to a branch circuit having a maximum overload protection of 20 A.

CAUTION:
Do not power on the fixture until *verifying* that the line cord cap is suitable for the power source in your location. For more information, see *Replacing a Power Cord Cap* on page 6.

To power on Axon, connect it to an appropriately-rated power source. If the media server doesn't start, check that the manual power switch behind the right door on the front panel is ON.

Note: To initialize the graphic card ports, both DVI ports must have devices connected when starting the media server. When only one port is connected, it defaults to display the graphics engine output and will not display the CMA screen.

Software Setup

Software setup for Axon requires the following steps described in this section:

1. **After powering on the Axon media server, launch the CMA software**
2. **Check the software version installed and upgrade if necessary.**
3. **Configure the Axon server DMX source, DMX protocol, and DMX Start Channel.**

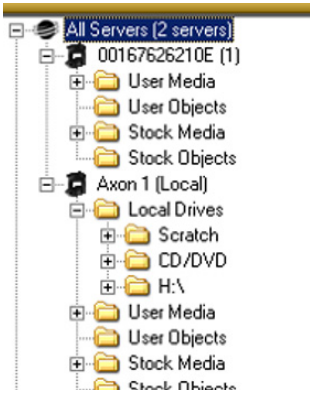
The Axon Desktop

Upon starting, the CMA monitor will display the Axon Desktop. Buttons on the desktop let you:

- **Launch CMA** software
- **Launch DMX View** that displays the current DMX control setting for all the channels on this media server
- **Reboot** the system
- Launch the online **Manual**

NOTE: ***If you do not see the CMA screen upon powering up the Axon media server, check that the monitor is connected to the top DVI port and that another output device is connected to the bottom DVI port . If only one port is connected, it defaults to media server output and the CMA screen will not be displayed.***

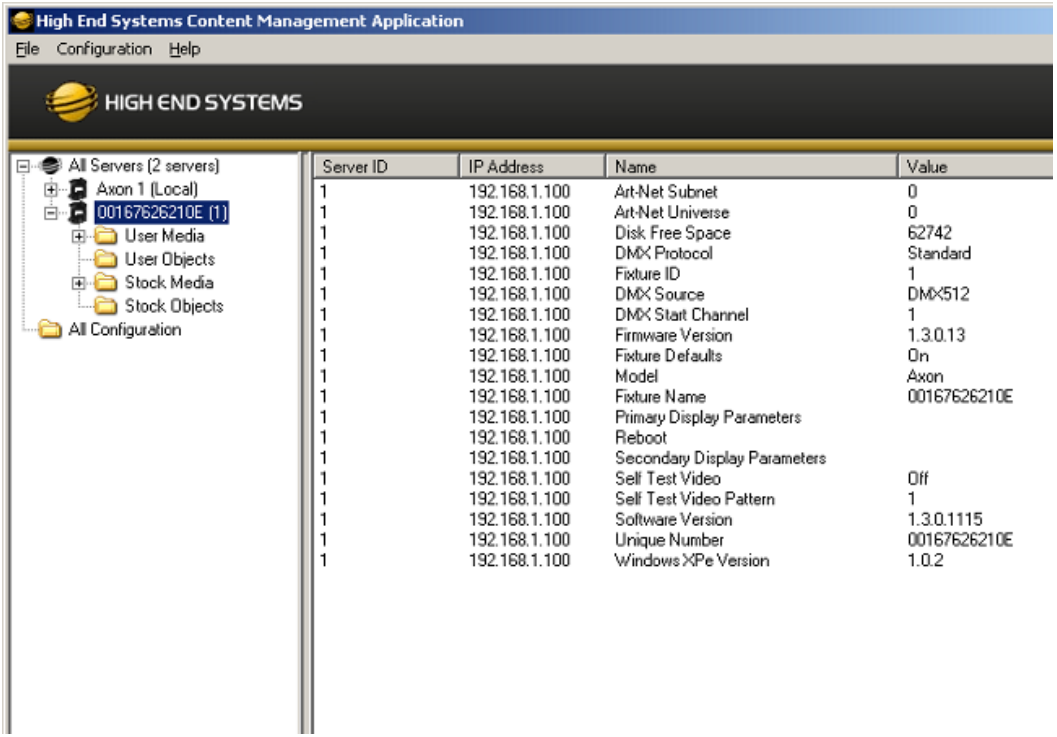
Launching the Content Management Application (CMA)



After starting up the Axon unit, press the **Launch CMA** button on the local desktop. The application automatically finds and identifies the **Local Drives** including any connected USB drives, as well as other Axon and DL.2 media servers connected to the same Ethernet network. For more information on CMA operation and using the CMA, see *Chapter 13: Content Management Application (CMA)* on page 157.

Verifying and Uploading Software

The latest Axon software and CMA software are always available at the High End Systems website, (**www.highend.com/support**). You can view the software version currently installed on your Axon unit through the CMA's **All Servers** view.



If you need to upgrade the software, first download the file from the website to your computer. Then use the CMA to upload it to Axon, (see *Upgrading Server Software* on page 173).

Configuring Axon

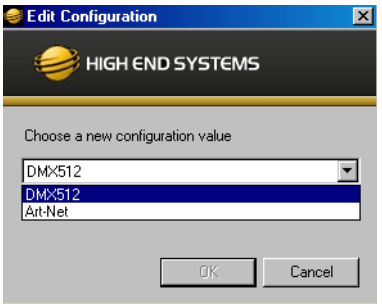
Before programming the Axon media server from a DMX512 console, you need to:

- Identify the DMX Source for the fixture
- Select the Protocol type to determine the DMX channel range this fixture will utilize
- If you will be synchronizing output between fixtures, verify that each server has a unique Fixture Number to identify it on the Ethernet link.
- Assign a valid Start Channel (the first channel in the unique range of DMX channels designated by the console for this Axon)

To view configuration information for a individual server, click on **All Servers** in the left pane of the CMA window and select the + to view all the servers on the fixture network. Select a server in the left pane to view its configuration information in the right pane.

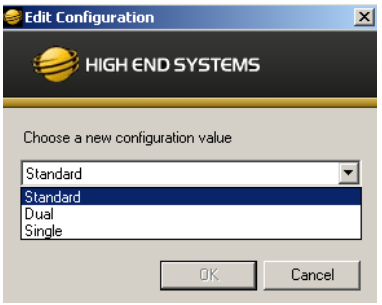
To select a **DMX Source** type:

1. Scroll down the Configuration list in the right pane and double click on the line with DMX Source in the Name column to bring up the edit dialog box.
2. Choose between **DMX512** and **ArtNet** as the source for DMX communication from the drop down list in the option field.



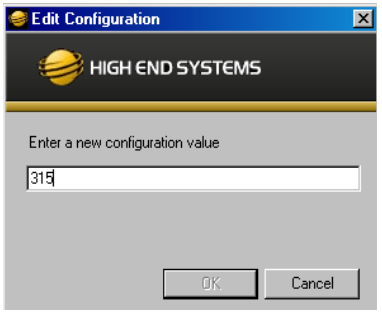
To Select a **DMX Protocol** type:

1. Scroll down the Configuration list in the right pane and double click on the line with DMX Protocol in the **Name** column to bring up the edit dialog box.
2. Choose **Standard**, **Dual**, or **Single** from the drop down list in the option field. For more information on protocol types, see



To edit the DMX **Start Channel**:

1. Scroll down the Configuration list in the right pane and double click on the line with Start Channel in the Name column to bring up the edit dialog box.
2. Enter a valid Axon Start Channel for the protocol type you have chosen.
   - Standard protocol = 1–364
   - Dual Protocol = 1–402
   - Single Protocol = 1–440



Shutting Down the Server

1. A DMX controller can shut down the server remotely with the shutdown option of the Global Control channel (see *Shutdown and Reset Options* on page 90).
2. Manually turn the unit off with the power switch located behind the right door on the front panel. If you choose to shut down with the power switch, you will need to manually turn it back on the next time you boot up the server.

Chapter 3:

DMX Programming Basics and Quick Start

If you are new to DMX programing, this chapter will give you a brief overview on programming Axon and DL.2 media servers followed by a example of using a Wholehog console to patch and display output from an Axon or DL.2 media server.

DMX Programming Overview

DMX512 Links

A lighting console typically utilizes a protocol called DMX512 to communicate with automated lighting fixtures and conventional dimmers. This protocol consists of 512 unique channels of control per output link (universe). Typically a lighting fixture or device will use a channel for each parameter's function. Each channel consists of 256 values ranging from 0 to 255. The lighting console is programmed to transmit a corresponding DMX value for the desired function of each parameter. All DMX values are stored within in the lighting console, and typically are referred to as cues, scenes, or presets. A lighting console locates a device on the link by it's DMX Start Channel.

8-bit vs. 16-bit DMX Parameters

Most parameters of an automated light use one channel of DMX providing 256 values of control (0-255). This is known as 8-bit DMX. Although most DL.2 parameters use 8-bit DMX, several require a more accurate range of values than can be provided with a single DMX channel.

By utilizing two DMX channels for a single parameter, 65535 values become available for controlling and adjusting parameter functions. This is known as 16-bit DMX. You can adjust 16-bit DMX values in both coarse and fine increments. The first channel of the pair provides coarse control changes of the DMX value in increments of 256. The second channel provides fine control and changes of the DMX value in increments of 1.

Individual access of the two DMX channels used with 16-bit parameters varies by lighting console. Most modern DMX consoles bind these two channels into a single 16-bit parameter to accurately perform 16-bit crossfades. Consult your lighting console manual for further information.

Determining a DMX Start Channel

The DMX Start Channel is the first channel of a device's channel range on a DMX link. There are 512 available channels on each DMX universe divided among all the devices in a particular universe. A device must have a unique DMX Start Channel number in order to respond independently to controller commands.

To determine each device's DMX Start Channel, identify the footprint of every device on the universe. The device's footprint is the number of consecutive DMX channels a device requires and is determined by the channels in the fixture's protocol. The fixture's DMX channel range must not overlap any other device's channel range on the link. When two devices on the same DMX universe have overlapping channel ranges, one or both devices will be disabled or behave erratically.

Axon media servers and DL.2 fixtures both provide individual and composite graphical control for up to three 3-D Objects. You can control the "footprint" of the fixture on a DMX link by choosing to implement only the number of 3-D objects your application requires. Select the protocol level in the fixture's onboard menu system for DL.2 fixtures or through the CMA for either DL.2 fixtures or Axon media servers (see *Viewing Fixture Configuration Values* on page 175).

Protocol Selection	DMX Channel Range	
	Axon	DL.2
Standard Protocol	149	170
Dual Protocol	111	132
Single Protocol	73	94

The tables that follow list the parameters included in each level of protocol for both the DL.2 fixture and the Axon media server.

DL.2 Protocol Levels

		Global Control		Graphic Object Control			
Chan #	Description	Chan #	Description	Obj 1	Obj 2	Obj 3	Description
Motion		22	Global Intensity	57	95	133	Opacity
1	Pan	23	Global Effect 1	58	96	134	3-D Object File
2		24	Global Effect 1 Modifier 1	59	97	135	Media Folder
3	Tilt	25	Global Effect 1 Modifier 2	60	98	136	Media file
4		26	Global Effect 1 Modifier 3	61	99	137	In frame
5	Dimmer	27	Global Effect 2	62	100	138	
6	Focus	28	Global Effect 2 Modifier 1	63	101	139	Out frame
7	Zoom	29	Global Effect 2 Modifier 2	64	102	140	
8	Mspeed	30	Global Effect 2 Modifier 3	65	103	141	Play mode
9	Macro	31	Mask Select (default iris)	66	104	142	Play speed
10	Control Function	32	Mask Size	67	105	143	Sync Mode
Camera		33	Mask Edge	68	106	144	Sync To
11	Zoom	34	Edge Fade Top	69	107	145	Visual mode
12		35	Edge Fade Right	70	108	146	Visual Mode Modifier 1
13	Focus	36	Edge Fade Bottom	71	109	147	Visual Mode Modifier 2
14		37	Edge Fade Left	72	110	148	Graphic Effect 1
15	Infrared	38	Keystone Top Left X	73	111	149	Effect 1 Modifier 1
16	Camera Shutter	39	Keystone Top Left Y	74	112	150	Effect 1 Modifier 2
17	White balance	40	Keystone Top Right X	75	113	151	Effect 1 Modifier 3
18	Camera Orientation	41	Keystone Top Right Y	76	114	152	Graphic Effect 2
19	Camera Effects	42	Keystone Bottom Right X	77	115	153	Effect 2 Modifier 1
20	Red Gain	43	Keystone Bottom Right Y	78	116	154	Effect 2 Modifier 2
21	Blue Gain	44	Keystone Bottom Left X	79	117	155	Effect 2 Modifier 3
21	Blue Gain	45	Keystone Bottom Left Y	80	118	156	X-axis rotation
		46	X Ratio	81	119	157	
		47	Y Ratio	82	120	158	Y -axis rotation
		48	Viewpoint mode	83	121	159	
		49	Viewpoint Position X	84	122	160	Z-sxis rotation
		50		85	123	161	
		51	Viewpoint Position Y	86	124	162	Scale X
		52		87	125	163	Scale Y
		53	VIewpoint Position Z	88	126	164	Scale Z
		54		89	127	165	X Position
		55	Global Control	90	128	166	
		56	Global Control Modifier	91	129	167	Y Position
				92	130	168	
				93	131	169	Z Position
				94	132	170	

Axon Protocol Levels

	Description	Obj 1	Obj 2	Obj 3	Description
1	Global Intensity	36	74	112	Opacity
2	Global Effect 1	37	75	113	3-D Object File
3	Global Effect 1 Modifier 1	38	76	114	Media Folder
4	Global Effect 1 Modifier 2	39	77	115	Media file
5	Global Effect 1 Modifier 3	40	78	116	In frame
6	Global Effect 2	41	79	117	
7	Global Effect 2 Modifier 1	42	80	118	Out frame
8	Global Effect 2 Modifier 2	43	81	119	
9	Global Effect 2 Modifier 3	44	82	120	Play mode
10	Mask Select (default iris)	45	83	121	Play speed
11	Mask Size	46	84	122	Sync Mode
12	Mask Edge	47	85	123	Sync To
13	Edge Fade Top	48	86	124	Visual mode
14	Edge Fade Right	49	87	125	Visual Mode Modifier 1
15	Edge Fade Bottom	50	88	126	Visual Mode Modifier 2
16	Edge Fade Left	51	89	127	Effect Mode 1
17	Keystone Top Left X	52	90	128	Effect 1 Modifier 1
18	Keystone Top Left Y	53	91	129	Effect 1 Modifier 2
19	Keystone Top Right X	54	92	130	Effect 1 Modifier 3
20	Keystone Top Right Y	55	93	131	Effect Mode 2
21	Keystone Bottom Right X	56	94	132	Effect 2 Modifier 1
22	Keystone Bottom Right Y	57	95	133	Effect 2 Modifier 2
23	Keystone Bottom Left X	58	96	134	Effect 2 Modifier 3
24	Keystone Bottom Left Y	59	97	135	X-axis rotation
25	X Ratio	60	98	136	
26	Y Ratio	61	99	137	Y -axis rotation
27	Viewpoint mode	62	100	138	
28	Viewpoint Position X	63	101	139	Z-sxis rotation
29		64	102	140	
30	Viewpoint Position Y	65	103	141	Scale X
31		66	104	142	Scale Y
32	VIewpoint Position Z	67	105	143	Scale Z
33		68	106	144	X Position
34	Global Control	69	107	145	
35	Global Control Modifier	70	108	146	Y Position
		71	109	147	
		72	110	148	Z Position
		73	111	149	

Lighting Console Tips

Lighting consoles differ in many aspects and it is important to understand how your console operates with Axon and DL.2 media servers.

Fixture Libraries:

Many sophisticated lighting consoles utilize pre-made fixture libraries. A fixture library consists of profiles for various types of lighting fixtures and devices. Each profile corresponds to the fixture's DMX protocol and allows for ease of programming. Depending upon the manufacturer of your lighting console, some parameters might have different labels for parameter names and functions than are listed within this manual. Consult your lighting console manual for further information.

Patching DL.2 Fixtures and Axon Media Servers

The DL.2 fixture consists of three different "fixture types" in the Wholehog 3 library systems. This allows for ease of programming as well as the ability to adjust quickly for any of the various DMX protocol options. The **Motion** fixture type controls the actual moving yoke, projector, and integrated camera. The **Global** fixture type controls the global graphic engine functions such as intensity, keystone correction, viewpoint, etc. The **Graphic** fixture type controls each graphic object functions such as opacity, object, media, etc. The DL.2 protocol allows for 1, 2, or 3 graphic objects.

An Axon media server had no motion control but utilizes the same **Global** and **Graphic** fixture types. In the Fixture Schedule or Add Fixtures window of Wholehog software, you would add 1 motion, 1 global, and 3 graphic "fixtures" for each complete DL.2 unit, or 1 global, and 3 graphic "fixtures" for each complete Axon unit.

The best way to organize your patching is to assign user numbers for these items. Patch the motion first, the global second, and the graphic fixture types last. For example, set up user numbers 1-5 that correspond to DL.2 fixture number 1, where user number 1 is the motion, 2 is the global, and 3-5 the graphic fixture types.

DMX Output Displays

Although all lighting consoles output the same 512 DMX channels per universe, the on-screen labeling often differs. Parameter functions are displayed in either alpha-numeric descriptions (strobe 1), percentage (0-100%) or decimal (0-255 for 8-bit and 0-65535 for 16-bit). Consult your lighting console manual for further information.

Wholehog III Programming Notes

Play Speed

You can adjust the Play Speed using the encoder wheel on the Beam parameter of the Graphic fixture type. Additionally you can press "enable" and select "Media Speed Default On" to revert to the default speed setting (DMX 128). Then if you touch the encoder again the previous play speed will be recalled.

Mask Strobe

A unique function of the Wholehog 3 library system allows the creation of a special encoder type. Flying Pig Systems has created a parameter called "mask strobe" in the Global fixture type. When this is adjusted, it will automatically change the DMX value of the mask select channel to the appropriate value and adjust the DMX channel for the strobe speed. This will override the Mask Edge parameter as per the DL2 DMX Protocol.

Play Modes (Opacity)

Using the Graphic fixture type, press the Mode button to view the play mode options. By default all modes trigger normally. If available per the DL2 DMX protocol, you can select "Media Trigger Opacity" to change to the Play Modes that trigger when Opacity is greater than zero. To restore to normal triggering, select "Media Trigger Normal".

CMY

The Global and Graphic fixture types both contain CMY controls for the Effect Mode modifier channels. The default for Effect Mode 1 is set to CMY1 as well. For some effect options, the CMY parameters will not adjust color, but will adjust the effect per the DL.2 DMX protocol. You can find a description of CMY controls functionality for each effect option in *Chapter 12: Effect Mode Options Descriptions* on page 117.

Control Channel Functions

Many of the control channel functions in the motion "fixture" only operate if the dimmer changes from >0 to 0 at the same time or just after a change is made to the control channel. See the DL2 protocol for specific information.

Quick Start Axon and DL.2 Control with a Wholehog Console

After Setting up and Configuring your media server (see *Setup and Configuration* on page 5), use the following steps to get to the point of displaying output.

Step 1: In the Fixture Schedule or Add Fixtures window of Wholehog software, Add 1 motion, 1 global, and 3 graphic "fixtures" for each complete DL.2 unit, or 1 global, and 3 graphic "fixtures" for each complete Axon unit.

Step 2: Assign user numbers for these items. Set up user numbers 1-5 that correspond to DL.2 fixture number 1, where user number 1 is the motion, 2 is the global, and 3-5 the graphic fixture types. Axon media servers will have user number 1-4 where user number one is global and 2-4 the graphic fixture types. Patch the motion first, the global second, and the graphic fixture types last.

Chapter 4:

Tutorials

Five simple lessons get you started programming DL.2 and Axon media servers with a Wholehog 3 or other DMX console.

The DL.2 fixture should be patched on your console as three to five fixture types. The MOTION fixture type controls the actual moving yoke, projector, and Digital Eye camera. The GLOBAL fixture type controls the global graphic engine functions such as intensity, keystone correction, viewpoint, etc. The GRAPHIC fixture type controls each graphic object's functions such as opacity, object, media, etc. The DL.2 and Axon protocol allows for 1, 2, or 3 graphic objects.Axon Media servers do not use the MOTION fixture type and require 1 GLOBAL and 1-3 GRAPHIC fixture types.

NOTE: The MOTION fixture Dimmer, GLOBAL fixture Intensity, and GRAPHIC fixture Opacity parameters all have to be greater than zero before the image you create becomes visible.

In the first three Lessons, the 3-D object component of the Graphic Objects is left at the default DMX value of 1 (flat plane). Note that all DMX values given in the examples are in decimal units.

If you have trouble producing the effects in these tutorials, and you are not working with a Wholehog 3 console library, the default settings may be incorrect. All recommended default values are listed in "DL.2 and Axon DMX Protocol".

Fixture Set-up (DL.2 Media Servers)

If you are using a DL.2 fixture, you will first need to set up the head and the projector. If you are using the Axon Media Server, this will not be necessary and you can proceed to Lesson 1. To set up the DL.2 fixture for the tutorials:

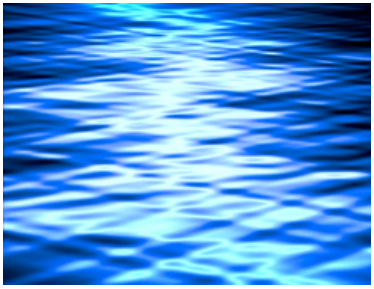
1. Select the DL.2's MOTION fixture, and set the **Dimmer** parameter to 100% (DMX = 255). This will open the mechanical iris.
2. Set the GLOBAL fixture **Intensity** parameter and GRAPHIC OBJECT 1 fixture **Opacity** parameter to 100% (DMX = 255).
3. Select the GRAPHIC OBJECT 1 and set the **Media Folder** to DMX = 39 (*HES Setup and Test*). Dial the **Media File** to DMX = 5. This will bring up the convergence bitmap.
4. Select the DL.2's MOTION fixture and adjust **Pan** and **Tilt** prarameters until the fixture is projecting to the desired location and adjust the **Focus** parameter until the convergence bitmap becomes sharply focused.
5. Now you can remove or "knockout" the GRAPHIC OBJECT from the programmer and still retain the MOTION and GLOBAL parameter settings.
6. Store these values somewhere on your console (to a palette or preset) so that this setup can be quickly recalled whenever you need to adjust the Pan Tilt and Focus.

Lesson I: Cross Fading Between Graphic Objects

1. On your lighting console, set MOTION fixture Dimmer parameter (for DL.2 fixtures), the GLOBAL fixture **Intensity** parameter, and GRAPHIC OBJECT 1 fixture **Opacity** parameter to 100% (DMX value = 255).

Define Graphic Object I

2. Set the **Media Folder** Parameter for the GRAPHIC OBJECT 1 fixture to DMX value = 4. This selects preloaded DL.2 media folder *HES Atmospheric*.
3. Set the **Media File** Parameter to DMX = 23. This selects a water movie (*23-Moonlite_Waves*).



Graphic Object 1

Add the DL.2 logo as Graphic Object 2

4. Select GRAPHIC OBJECT 2 fixture and change the **Opacity** parameter to 100% (DMX = 255).
5. Set the **Media Folder** parameter to 1 and set the **Media File** parameter to DMX = 01. This selects the preloaded DL.2 logo as content.

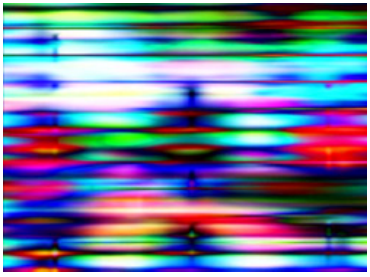
Graphic Object 2

Define Graphic Object 3

1. Select GRAPHIC OBJECT 3 fixture and set the **Opacity** to DMX = 255 (100%).
2. Change the **Media Folder** parameter to DMX = 7 (*A Luna Blue* collection).
3. Change the **Media File** parameter to DMX = 2 (*2-Blurs_Streaks_34*).

Create Crossfade Cues

4. Select GRAPHIC OBJECT 2 and 3 fixtures and set the **Opacity** parameter on both to DMX = 0. The only content that is now showing is GRAPHIC OBJECT 1.
5. Record this look to your console as cue 1.
6. Set the of GRAPHIC OBJECT 3 **Opacity** parameter to DMX = 255 (100%) and record this into your lighting console as cue 2.
7. Now set the **Opacity** parameter of GRAPHIC OBJECT 3 to DMX = 0 and the **Opacity** of GRAPHIC OBJECT 2 to DMX = 255 (100%). Record this as cue 3.



Graphic Object 3

8. Now clear out all information in your console's programmer and play through the cues you just recorded. You will see GRAPHIC OBJECT 1 crossfade to GRAPHIC OBJECT 3 and then crossfade to GRAPHIC OBJECT 2.

Lesson 2 - Working with Multiple Graphic Objects

In this lesson, you will combine 2 Graphic Objects and use Chromakey Effect options to create transparencies. You will be building off of cue 3 that was created in Lesson 1.

1. Be sure that the MOTION **Dimmer** parameter (for DL.2 fixtures), the GLOBAL **Intensity** parameter, and GRAPHIC OBJECT 1 and 2 **Opacity** parameters are all set to 100% (DMX = 255).

Apply Transparency Effects

2. With the GRAPHIC OBJECT 2 selected, open the **Effect Mode 1** parameter.
3. Select the *Chromakey Medium* option(DMX = 27). The DL.2 logo "floats" on a water background.
4. Select *Invert Chroma Fine* option (DMX value = 29). Now the Graphic Object 1 content shows through the logo.
5. Record this look to your console.

Lesson 3 - Girt, the Fire Breathing Lizard

In this lesson you will use Rotation, X, Y, and Z positioning, and scaling parameters to control the interaction of multiple Graphic Objects. Before you begin, clear any information out of your programmer. Also, release playback of cues used in Lessons 1 and 2. You may want to start a new cuelist for this exercise. If you are using a DL.2, be sure that you have set the fixture's motion parameters up as described in the beginning of this tutorial.

1. Be sure that the MOTION **Dimmer** parameter (for DL.2 fixtures), the GLOBAL **Intensity** parameter, and GRAPHIC OBJECT 1 **Opacity** parameter are all set to 100% (DMX = 255).

Define Graphic Object 1

2. Set the **Media Folder** parameter for GRAPHIC OBJECT 1 to DMX = 14 (HES Theme Stills).
3. Set the **Media File** parameter to a DMX value = 10. (10-Tropical_10.jpg)

Define Graphic Object 2

The following steps select and position a flame graphic object.

4. Select the GRAPHIC OBJECT 2 and set the **Opacity** parameter to DMX = 255 (100%).
5. Set the **Media Folder** parameter to DMX = 4 (HES Atmospheric).
6. Set the **Media file** parameter to DMX = 16 (16-Fire_Triple_Burst).
7. Set **Effect Mode 1** parameter for GRAPHIC OBJECT 2 to DMX = 28 to select the Chromakey Coarse effect. This will make the black background transparent.
8. Reduce the Y Scale parameter to -5.7x (DMX = 55).
9. Reduce the X Scale parameter to -2x (DMX = 102).
10. Set the X Position parameter to a real world value of 37 pixels (DMX = 33530).
11. Set the Y Position parameter to a real world value of 13 pixels (DMX = 33042).
12. Set the Z Rotation parameter to a real world value of -25° (DMX = 33042).

Define Graphic Object 3

The following steps create and position a puff of smoke.

13. Select the GRAPHIC OBJECT 3 and set the **Opacity** parameter to DMX = 255 (100%).
14. Set the **Media Folder** parameter to DMX = 4 (HES Atmospheric).
15. Set the **Media File** parameter to a DMX value of 17 (17-Dust_Explosion).

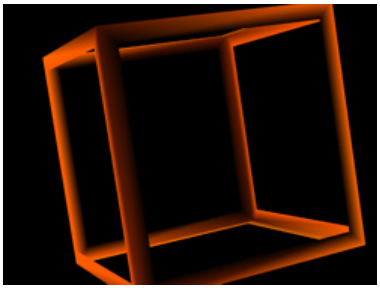
16. Set **Effect Mode 1** parameter for GRAPHIC OBJECT 3 to DMX = 28 to select the Chromakey Coarse effect. This will make the black background transparent.
17. Set the **X Scale** parameter to a real world value of -7.4x. (DMX = 33)
18. Set the **Y Scale** parameter to a real world value of -6.4x. (DMX = 46)
19. Set the **X Position** parameter to a value of 20 pixels. (DMX = 33177)
20. Set the **Y Position** parameter to a value of 8 pixels. (DMX = 33932)
21. Record this look into your lighting console.

Lesson 4: 3-D Objects, Rotation, Wobbulation, and Glow.

In this lesson you will learn how to put your chosen content on a 3D object and add rotation, glow, and wobbulation.

1. Be sure that the MOTION **Dimmer** parameter (for DL.2 fixtures), the GLOBAL **Intensity** parameter, and GRAPHIC OBJECT 1 **Opacity** parameter are all set to 100% (DMX = 255).

Define Graphic Object 1

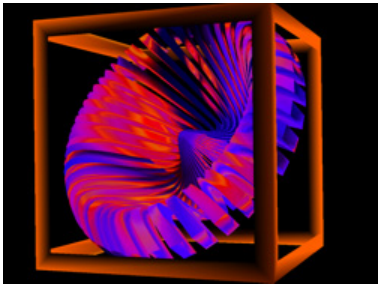


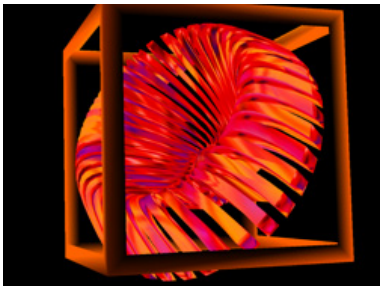
2. With GRAPHIC OBJECT 1 selected, set the **Media Folder** parameter to DMX = 1 (HES Core).
3. Set the **Media File** parameter to DMX = 3. This will call up a black jpg.
4. Change the **Object** parameter to DMX = 23 (Outside Cube).
5. Set the **Effect Mode 1** to DMX = 73 (Glow)
6. Set the **Effect 1 Modifier 1** parameter to 93% (DMX = 236)
7. Set the **Effect 1 Modifier 2** parameter to 25% (DMX = 63).

Note: Modifier channels for Effect Mode 1 are labeled as CMY in the Wholehog 3 system so you can also make use of the color picker, HSI, and other Wholehog 3 functions. Use the CMY parameter controls to adjust the three Effect Mode 1 Modifier parameters for both the Global and Graphic fixture types.

8. Change the **X Rotation** parameter to 5°. (DMX = 32887)
9. Change the **Y Rotation** parameter to a real world value of -32°. (DMX = 32033)

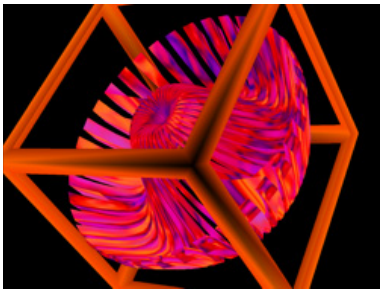
Define Graphic Object 2





10. Select GRAPHIC OBJECT 2 and set the **Opacity** parameter to DMX = 255 (100%).
11. Change the **Media Folder** parameter to DMX = 6 (*Sean Bridwell*)
12. Change the **Media File** parameter to DMX = 16 (*Fractal_Flower*).
13. Change the **Object** parameter to DMX = 9 (*moiré swirl*)
14. Change the **X Rotation** parameter to 28° (DMX = 33405)
15. Change the **Y Rotation** parameter to 36° (DMX = 33577)
16. Open the **Effect Mode 1** parameter and set DMX = 66 (*Circular Sinewave Z-axis Wobbulation)*.

Adjust this effect with the Modifer parameters.



17. Set the Effect Mode 1 Modifier 1 parameter to DMX = 104 (41%) to adjust wave size.
18. Set the Effect Mode 1 Modifier 2 parameter to DMX = 86 (34%) to adjust wobbulation rate.
19. Set the Effect Mode 1 Modifier 3 parameter to DMX = 114 (45%) to adjust offset.

NOTE: Modifier parameters make different adjustments depending on the effect you choose.

Lesson 5: Viewpoint

This lesson demonstrates the global parameters including viewpoint, and global effects.

1. Be sure that the MOTION **Dimmer** parameter, (for DL.2 fixtures) the GLOBAL **Intensity** parameter, and GRAPHIC OBJECT 1 **Opacity** parameter are all set to 100% (DMX = 255).

Define Graphic Object 1

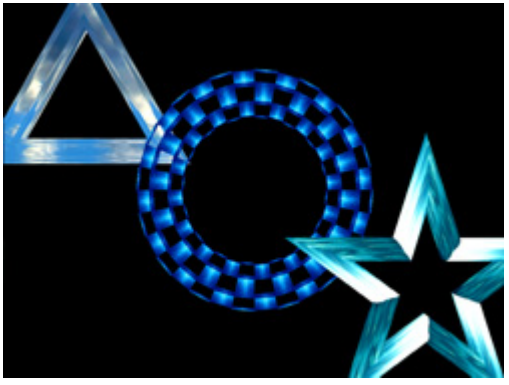
2. With GRAPHIC OBJECT 1 selected, change the **Media Folder** parameter to *feedback video* (DMX = 8).
3. Change the **Media File** parameter to DMX = 7 (*7-SD_Cloud010*)
4. Change the **Object** parameter to DMX = 21 (*triangle*)
5. Set the **Z Position** parameter to 118 pixels (DMX = 35187), the **Y Position** parameter to 30 pixels (DMX = 33372), and the **X Position** parameter to -43 pixels (DMX = 31888).

Define Graphic Object 2

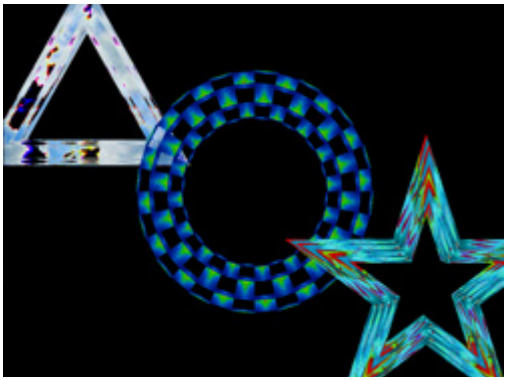
6. Select GRAPHIC OBJECT 2 and bring the **Intensity** parameter to 100% (DMX =255).
7. Change the **Media Folder** parameter to DMX = 8 (*feedback video*).
8. Change the **Media File** parameter to DMX = 9 *(9-SD_Deep01*)
9. Change the **Object** parameter to DMX = 8 (*toroid chk board*)
10. Change the **Z Position** parameter to a value of 64 pixels (DMX = 34087)

Define Graphic Object 3

11. Select the GRAPHIC OBJECT 3 and change the **Intensity** parameter to 100% (DMX = 255).
12. Set the **Media Folder** parameter to DMX = 8 (*feedback video*)
13. Set the **Media File** parameter to DMX = 8 (*8-S_Dash*)
14. Change the **Object** parameter to DMX = 44 (*star bevel 4*)
15. Set the **Z Position** parameter to 40 pixels (DMX = 33592), the **Y Position** parameter to -13 pixels (DMX = 32493), and the **X Position** parameter to 30 pixels (DMX = 33372).

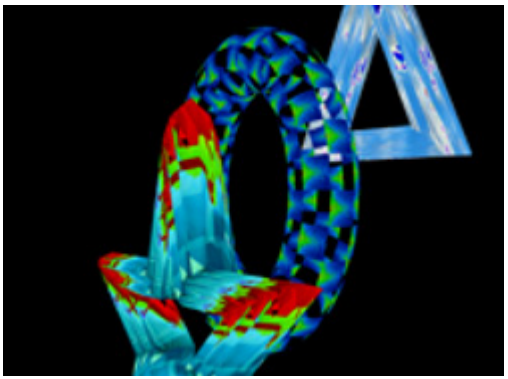


Apply a Global Solarize Effect

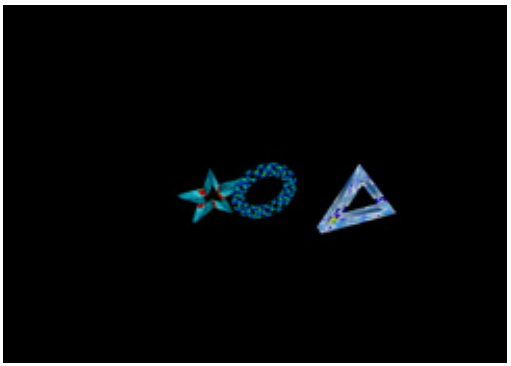


16. Select your GLOBAL fixture and change the **Effect Mode 1** parameter to DMX = 10 (*solarize 2*) and observe how the global effect changes all three of the graphic objects at one time
17. Record this look into your console.

Adjust Global Viewpoint Mode



18. To select the *Perspective View with Spherical Coordinates* centered on Graphic Object 2, set the **Global Viewpoint Mode** parameter to *sphr lyr 2* (DMX = 2).
19. Change the **Viewpoint Position X** parameter to 316° and see how this changes the viewpoint position of all three graphic objects at one time.



20. Change the value of the **Viewpoint Mode** parameter to *ortho lyr 2* (DMX = 10) for an Orthogonal View using Cartesian Coordinates.
21. Set **Viewpoint Position X** parameter to 39° (DMX = 36337)
22. Set **Viewpoint Position Y** parameter to 101° (DMX = 41947)
23. Set **Viewpoint Position Z** parameter to 116° (DMX = 43354).
24. Record this into your console and play back the cues you have created to observe how viewpoint changes the perspective on the graphic objects.

Chapter 5:

Graphics Engine Overview

DL.2 fixture's and Axon Media servers both use the same graphic engine software to control content selection, playback, and 3-D Object and Global manipulation.

Axon Protocol Options

Axon media servers and DL.2 fixtures both provide individual and composite graphical control for up to three 3-D Objects. You can control the "footprint" of the fixture on a DMX link by choosing to implement only the number of 3-D objects you need. Select the protocol level in the fixture's onboard menu system for DL.2 fixtures or through the CMA for both DL.2 fixtures and Axon media servers (see *Viewing Fixture Configuration Values* on page 175).

Appendix A: DL.2 and Axon DMX Protocol on page 189 has a detailed listing of all the parameters for Axon media servers and they are discussed in more detail in the following chapters.

Protocol Selection	DMX Channel Range	
	Axon	DL.2
Standard Protocol	149	170
Dual Protocol	111	132
Single Protocol	73	94

Image Optimizing Controls

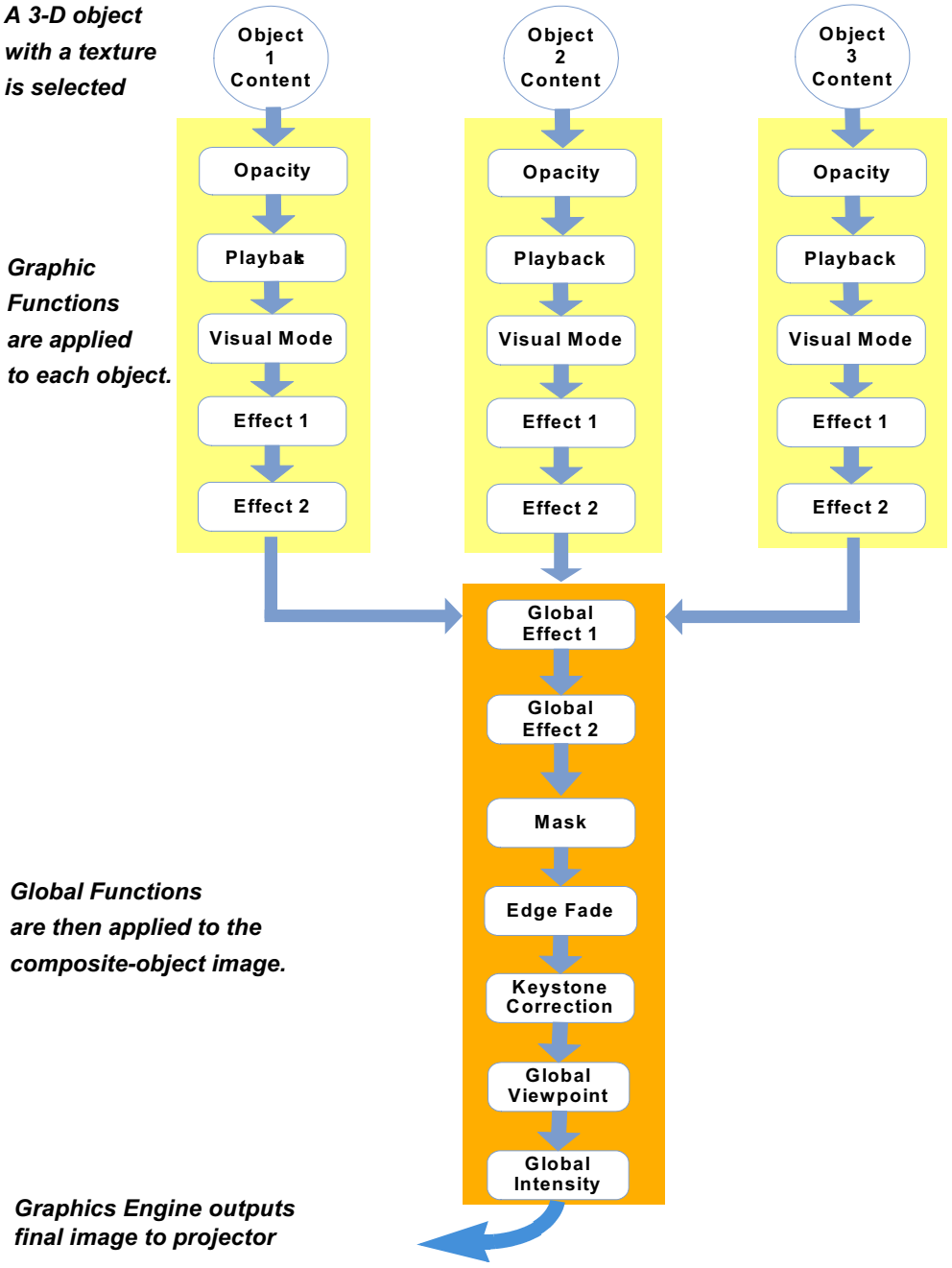
Images can now be optimized for each cue. It is no longer necessary to pre-optimize images with a separate software system on a separate computer when preparing for a show. Using Visual modes, (see *Visual Mode Options* on page 60), you can adjust both Black Level and Contrast for each cue and for each image.

Graphics Control Hierarchy

There is a hierarchy to the DMX control parameters. In general, object control parameters render individual graphic images. Global control parameters act upon the composite image created by combining multiple objects. Motion parameters control the fixture movement and projection as well as live video feed from the internal camera.

It is especially important to keep this in mind when applying graphical effects. At the lowest level, Graphic effects are applied to an individual 3-D Graphic Object. Any Global effects applied affect each object in the combined Object image. Finally, motion effects control the projection of the composite image.

Graphics Engine Function Flow



Graphics Engine Functions

Object Graphic Functions

For an individual object, you can control:

- The media file and 3-D object selection for the layer
- Media playback including
  - What portion of the movie plays
  - Playback speed
  - Playback mode (direction and style of playback)
- The object transparency (opacity)
- Visual Effects including colormixing and geometric effects
- Synchronization
- Image Rotation, Scale and Position

Global Functions

Global controls are applied to composite image created by multiple 3-D images. For the combined image, you can:

- Adjust the composite image intensity level
- Apply visual effects including colormixing and geometric effects
- Select a mask shape, size it and apply edge fades and color to the mask
- Apply and color mix an image edge fade
- Control keystone correction
- Establish the point in 3-D space from which image will be viewed

Making Graphics Effect Choices

Because you have control of many parameters, there are sometimes several ways to accomplish the same look. For Example, to make an object appear larger, you can scale it along the x, y and z axis, or you can apply a global control to zoom in on the z axis from a viewpoint that makes the object seem to increase in size.

Which solution you choose depends, to a large extent, on the transition to other effects you want to achieve.

Chapter 6:

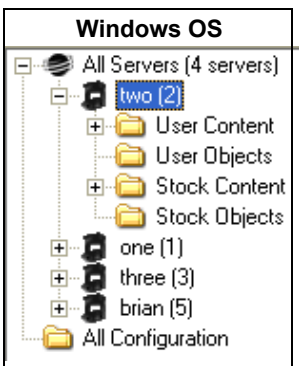
Graphic Functions: Defining Content

Each Graphic Object's content is composed of a 3-D object overlaid with a media file. This chapter outlines how to select an image's object and media file components as well as define the video segment and its playback.

Selecting Content

How Content is Organized

Every Axon and DL.2 media server has a file system that holds the movies, images, and 3-D objects that make up the content that the server uses. These files, folders, and their associated DMX values are collectively known as the "Content" on the media server.



The Content Management Application (CMA) organizes and identifies content by source (preloaded Stock content or custom User content) and type (Media files or 3-D Object files). For more information on using the CMA to view and manage content, see *Content Management Application (CMA)* on page 157.

Selecting Content

Three Parameters control Content selection. To define an image you have to set DMX values greater than 0 for the 3-D Object, Media Folder, and Media File parameters. The selected media file will be mapped onto the selected 3-D object.

Axon media servers

To output an image from a media server

1. Open the mechanical iris on the projector by setting it's Dimmer parameter to full (100%).
2. Set the Global Intensity parameter to full (100%).
3. Set the Object opacity to full (100%)
4. Adjust the Object, Media Folder, and Media File parameters to greater than zero

When programming with Wholehog software, the Media Folder and Object parameters default to 1 so choosing any Media File DMX value from 1-35 will display a media loop from the HES Core folder (Media Folder 1) wrapped on a Flat Plane (Object 1).

Remember: The Dimmer, Opacity and Global Intensity Parameters all have to be greater than zero before the image you create becomes visible.

Content Selection Parameters

The following sections outline parameters you will use to create an image from content and define it's playback. You will set the parameters described in this chapter for ***each*** individual Graphic Object you define.

Note: ***The suggested default DMX values given for each parameter are recommended to build libraries that provide the easiest and most reliable content selection, rendering and output. They are the default values built into the Wholehog libraries for High End Systems consoles.***

Object

The **Object** parameter selects the 3-dimensional object component of an image. Object files are the 3-D object shapes used to build a total image. The graphics engine supports a combined total of 255 stock and user-created object files.

Stock Objects have a fixed DMX value and cannot be edited. DMX values 1-149 are reserved for identifying stock object files. User created object files must be assigned a unique DMX value from 150-255.

For a reference of 3-D object files available as stock content with your media server and information on how to create your own object files, go to the link for the Stock Object Guide for the Axon or DL.2 products on http://www.highend.com/support/digital_lighting/.

Default DMX Value: 1 = full screen flat surface

TIP: ***You can select the same object file for images that will be interacting with each other. If both objects occupy exactly the same area in 3-D space, "Z-fighting" (a shimmering effect) on some portions of the composite image can occur as the graphics engine tries to determine which object should be in the foreground.***

You can avoid this effect by making a slight adjustment to one of the object's scale or moving it forward or back (using the Z Position parameter) in respect to the other.

Media Folder

This parameter defines a folder (directory) containing a collection of media files. The media files within the assigned folder can then be selected using the Media File parameter. Media Folder DMX values are assigned as follows:

- DMX values from 1-38 select from the stock Media collections that shipped with your media server.
- A DMX value of 39 is reserved for a Setup and Test folder.
- DMX Values 40–239 are reserved for assignment to Custom folders containing user Media collections
- A DMX value of 255 selects the live video feed from a DL.2 integrated video camera capture or S-Video input.

Default DMX Value: = 1 (HES Core Media files)

Media Folder Descriptions

DMX Value	Media Folder Name	Content Description
1	HES Core Media Files	Premier High End Systems video loop collection
2	HES_Digital_Aerials_1	Digital still images and animations, designed specifically for aerial effects
3	HES_Oils	Digitally simulated psychedelic oil projection loops
4	HES_Atmospheric	Video loops of natural settings clouds, water, fire
5	On_The_Wall_Studios	Digital video loops, promotional
6	Sean_Bridwell	Digital video loops, promotional
7	A_Luna_Blue	Digital video loops, promotional
8	Feedback_Video	Digital video loops, promotional
9	HES_Textures	Video loop textures
10	HES_Foliage	Collection of abstract and realistic foliage and floral video loops
11	HES_Religious	Religious themed video loops
12	HES_Gothic	Set of themed video loops
13	HES_Digital_Aerials _2	Digital still images and animations, designed specifically for aerial effects
14	HES_Theme_Stills	Nature stills (foliage and flowers)
15	Apollo Glass 1	Digital Gobo Patterns, promotional
16	Artbeats	Digital video loops, promotional
17	DHA_TopMac	Digital patterns, promotional
18	Beacon DigiGobos	Digital video loops, promotional
19	Amorphous Digi-gobos	Digital animations, promotional
20	InLight	Digital video loops, promotional
21	HES_Lithopatterns_1	High End Systems Lithopattern® images
22	HES_Lithopatterns_2	More images from High End Systems Lithopattern library
23	HES_Logos	High End Systems® Axon and DL.2™ logos
24	HES_Hi_Res	Variety of high resolution video backgrounds

DMX Value	Media Folder Name	Content Description
25	NASA_Images	Space images from the Hubble telescope
26	Blue_Pony	Assorted video loops
27	Diagnostics	Setup and Test images
28-39	Reserved	Reserved for HES use
40-240	Open	Available for User Content
255	Video Input	Live video input from internal camera or external device

Media File

The Media File parameter lets you identify which Stock or User media file to apply (map) as a texture on the selected 3-D object. You can supplement the large library of Stock video loops and still images with Custom files. This parameter selects media files from within the folder defined by the Media Folder parameter.

For a reference of media files available as stock content with your media server, go to the link for the Stock Content Guide for Axon or DL.2 products on **http://www.highend.com/support/digital_lighting/**. You can also view thumbnail images of media files in the CMA, (see *Viewing Files* on page 163.

Default DMX Value: 0 = No file selected

Tip: You can preview a visual display of the media files loaded on a media server in the Content Management Application's thumbnails view, (see **Viewing Content** *on page 163) or in the File Tab of a DL.2 fixture menu display.*

Defining a Media File Segment

You can define any portion of a video media file to play using the **In Frame** and **Out Frame** parameters. By default, the In Frame is the beginning of the media file and the Out Frame is the end of the file. Media files can have different lengths.

In Frame and Out Frame Parameters

You can select any segment of a media file for playback by assigning an In Frame value as a start point and an Out Frame as an end point.

> ***Note:*** ***DMX parameter values for these parameters do not correspond to a particular "frame". They are defined as a percentage of the movie length. This makes it possible to create segments with an Out Frame preceding the In Frame and simplifies playback synchronization between media files.***

The **In Frame** parameter corresponds to a 16-bit DMX value equal to a starting point for the playback segment of the selected file. The **Out Frame** parameter corresponds to a 16-bit DMX value equal to an end point for the playback segment of the selected media file.

Assigning the In Frame and Out Frame parameters to default DMX values will playback the entire movie file. Choosing other settings are useful when you want to:

- begin or end a media file at any point other than the default
- start or stop on a specific image
- you need to shorten the media file to a specific length

In Frame Default DMX Value: 0 = The beginning of a media file is the playback start point.

Out Frame Default DMX Value: 65535 = The end of a media file is the playback endpoint.

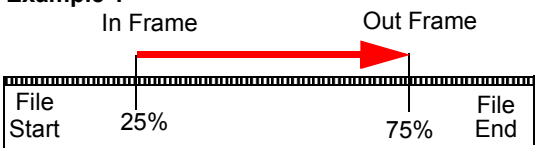
As you move from 0 to 100% of the **In Frame** value range, you can select the beginning of a media file segment as a percentage of the file length. Moving from 0 to 100% of the **Out Frame** value range selects the end of a media file segment as a percentage of the file length.

Segment Selection Examples

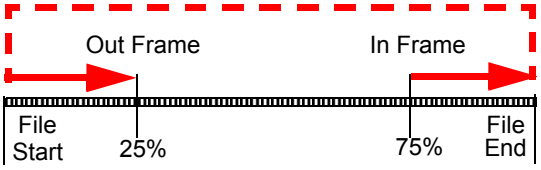
You can create a segment anywhere between the beginning and the end of a media file. The In Frame does not have to precede the Out Frame.

To skip a segment in the center of a media file, set the In Frame to a point following the Out Frame. The file will play from the In Frame to the end and then start at the begin-ning of the file and play to the Out Frame. When you create a segment in this way, you may notice a jump as playback skips from the end of the file to the beginning.

Example 1



Example 2



Defining Playback

After selecting and defining a media file segment to display on a 3-D object, you can choose from several Playback Modes and assign a Playback Speed.

Playback Mode

A **Playback Mode** parameter for each 3-D image allows several playback options.

Default DMX Value: 0 = Plays forward in a continuous loop

DMX Value	Playback Mode	Description
0	Play forward looping	Plays the media segment from In Frame setting to Out Frame setting, looping continuously
1	Play forward once	Plays the media segment from In Frame setting to Out Frame setting, and holds on the last frame
2	Pause	Stops playback at the frame currently playing
3	Play forward once if opacity > 0	Plays the media segment from In Frame setting to Out Frame setting, and holds on the last frame, Plays only when the content opacity value is greater than zero.
4	Play forward if opacity > 0	Plays media segment from In Frame setting to Out Frame setting, looping continuously. Plays only when the content opacity value is greater than zero.
5	Pause and rewind	Stops playback at the frame currently playing, then jumps to the In Frame setting.
6	Scrub In Frame	Displays frame that has been defined by the In Frame parameter
7	Scrub Out Frame	Displays frame that has been defined by the Out Frame parameter
8	Scrub In Frame with statistics	Displays frame that has been defined by the In Frame parameter with media file data overlaid on the output.
9	Scrub Out Frame with statistics	Displays frame that has been defined by the Out Frame parameter with media file data overlaid on the output.

Scrubbing displays the selected frame of the composite output of the media server. While scrubbing the In Frame, the frame selected by the In Frame coarse and fine channels will be displayed. Likewise, scrubbing the Out Frame will display the frame selected by the Out Frame coarse and fine channels. When the "with statistics" option is selected, the composite output includes text data related to the selected frame. Remember that the In Frame and Out Frame parameters are defined as a DMX value mapped to the percentage of the media file length, not a specific frame.

Note: ***If the Global Control Mode parameter = 255, a DMX value of 1-3 for the Global Control parameter provides an alternate font color to enhance statistics readability.***

Playback Speed

The **Playback Speed** parameter controls the speed of the selected media file's Playback Mode. The Playback Speed for a media file is used whenever the Playback Mode Parameter's DMX value is assigned to any Play Forward option.

Default DMX Value: 128 = Playback at normal speed.

A DMX value of 0 or 128 (50%) plays back media files at the original recorded speed. DMX values from 1 to 127 plays the media file back at an increasing speed, from slowest to the original recorded speed. Values from 129-255 set playback speed from faster than normal to fastest speed.

Chapter 7:

Graphic Functions: Rotation, Position, Scale

You can independently control each Graphic Object's rotation direction and speed; along with it's position and scale in x, y, and z axis directions.

The parameters described in this chapter are set for each Graphic Object you define. Parameters for composite image rotation, position and global scale are described in *Chapter 10: Global Functions*.

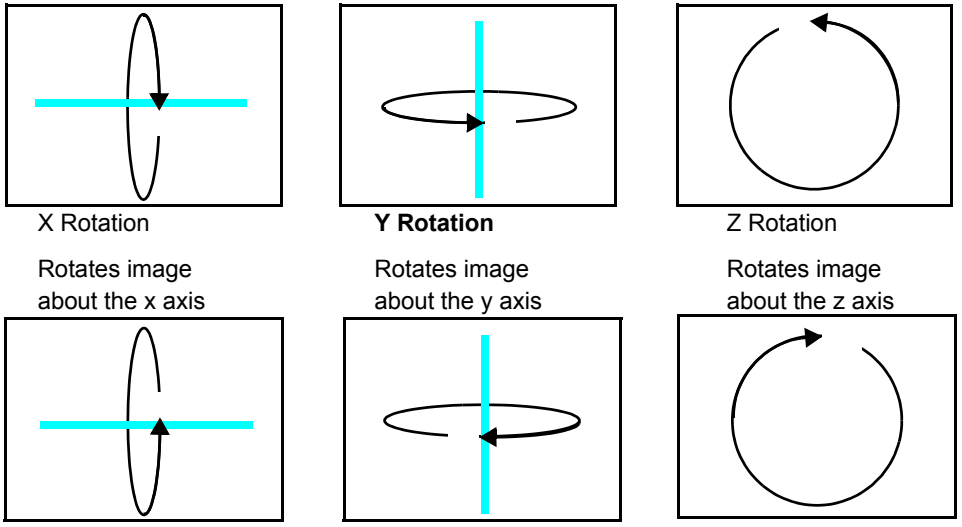
Note: The suggested default DMX values given for each parameter are recommended to build libraries that provide the easiest and most reliable content selection, rendering and output.

Rotating a 3-D Object

The **Rotation** parameters for each object control 3-D object rotation with 16-bit precision. You can rotate a 3-D object up to 720° in either a clockwise or counterclockwise direction around the X, Y and/or Z axis.

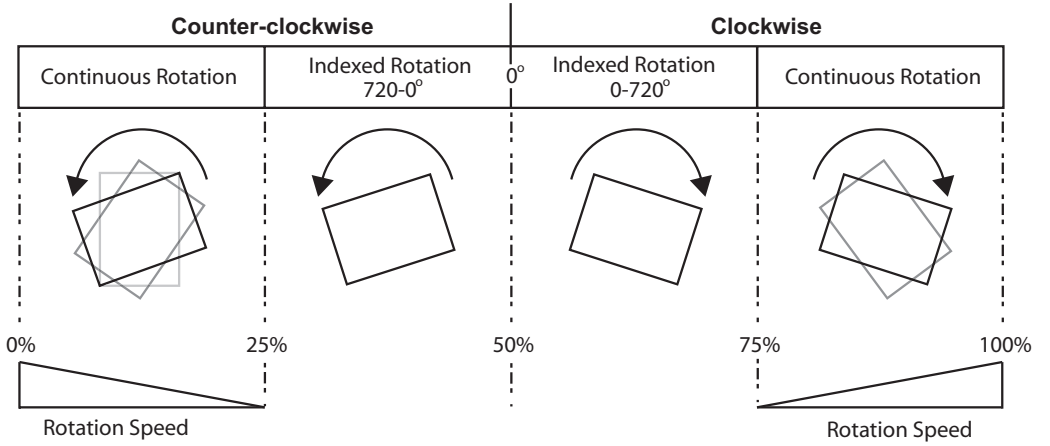
Note: Remember that rotation changes could affect an object's relationship to other objects.

When you rotate an object, you are rotating it around the selected axis. **X Rotation** produces the effect of a top-to-bottom flip. **Y Rotation** produces a left-to-right flip. **Z Rotation** causes a circular motion.



The Rotation parameters' suggested default values are the midpoint of the 16-bit DMX value range, which is equal to no rotation. Increasing the DMX value from the midpoint indexes the object in a clockwise direction. Reducing the DMX value below the midpoint indexes the object in a counterclockwise direction.

When the DMX value for a rotation parameter is greater than the 720° limit in either direction, the object begins rotating continuously. Additional adjustment to the DMX values increases the speed of continuous rotation.



Rotation Parameters

X Rotation

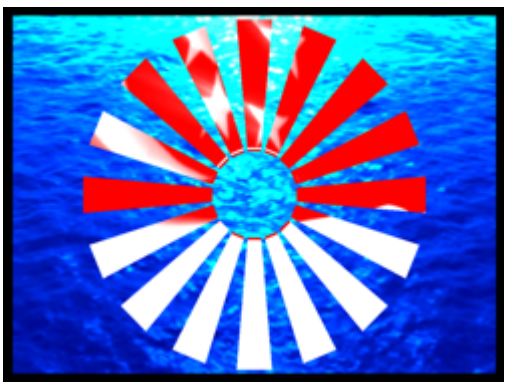
The **X Rotation** parameter rotates the selected Graphic Object around the x axis with 16-bit precision. You can index the rotation or set a continuous rotation creating a vertical flip at variable speeds.

This parameter lets you view an object from a different angle by turning the object. You can also view an object from a different angle by changing the viewpoint in space for the composite image, (see *Global Viewpoint Mode* on page 98).

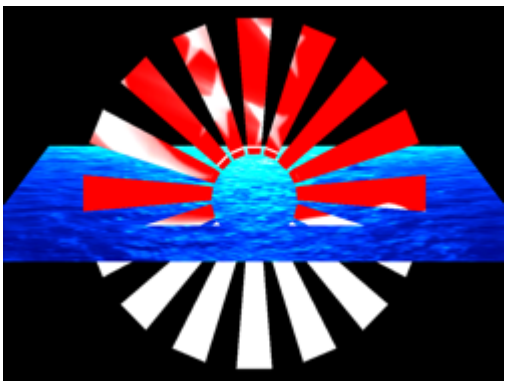
Default DMX Value: 32768 (50%) = No X Rotation

% of Value Range	Function
1–24	Continuous variable-speed counterclockwise image rotation around X-axis (fast to slow)
25	Continuous rotation stop
26–49	Rotates the image counterclockwise around X-axis in steps to –720 degrees
50	0° rotation around X-axis
51–74	Rotates the image clockwise around X-axis in steps to 720 degrees absolute
75	Continuous rotation stop
76–100	Continuous variable-speed clockwise image rotation around X-axis (slow to fast)

Tip: Using this parameter you can turn one object through another.



Original Object 1 and Object 2



X-axis Rotation Applied to Object 2

Y Rotation

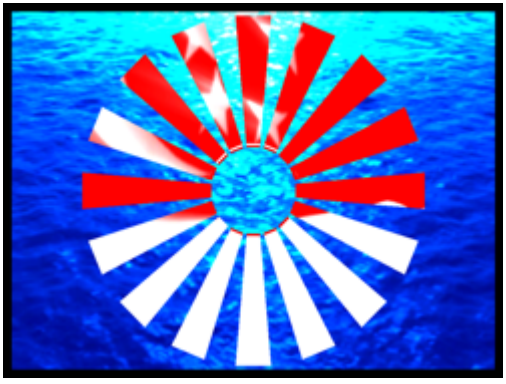
The **Y Rotation** parameter rotates or indexes the selected Graphic Object around the Y axis with 16-bit precision. You can index the rotation or set a continuous rotation creating a horizontal flip at variable speeds.

This parameter lets you view an object from a different angle by turning the object. You can also view an object from a different angle by changing the viewpoint in space for the composite image, (see *Global Viewpoint Mode* on page 98).

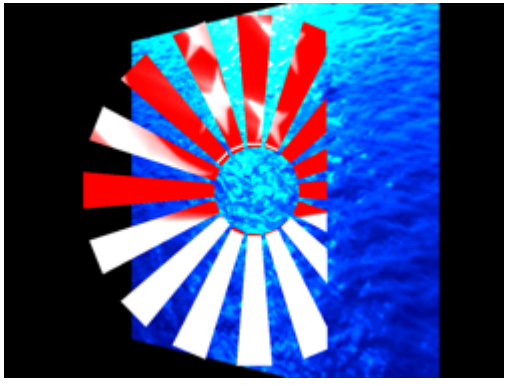
Default DMX Value: 32768 (50%)= No Y Rotation

% of Value Range	Function
1–24	Continuous variable-speed counterclockwise image rotation around Y-axis (fast to slow)
25	Continuous rotation stop
26–49	Rotates the image counterclockwise around Y-axis in steps to –720 degrees
50	0° rotation around Y-axis
51–74	Rotates the image clockwise around Y-axis in steps to 720 degrees absolute
75	Continuous rotation stop
76–100	Continuous variable-speed clockwise image rotation around Y-axis (slow to fast)

Tip: Using this parameter you can turn one object through another



Original Object 1 and Object 2



Y-axis rotation applied to Object 2

Z Rotation

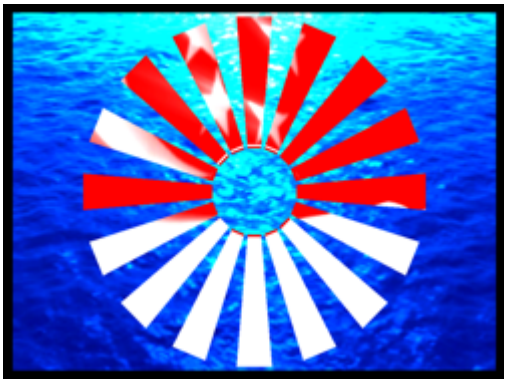
The **Z Rotation** parameter rotates or indexes the selected Graphic Object around the Z axis with 16-bit precision. You can index the rotation or set a continuous rotation creating a circular spin at variable speeds.

Default DMX Value: 32768 (50%)= No Z Rotation

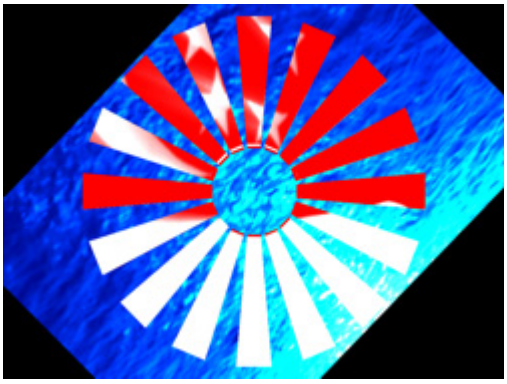
% of Value Range	Function
1–24	Continuous variable-speed counterclockwise image rotation around Z-axis (fast to slow)
25	Continuous rotation stop
26–49	Rotates the image counterclockwise around Z-axis in steps to –720 degrees
50	0° rotation around Z-axis
51–74	Rotates the image clockwise around Z-axis in steps to +720 degrees
75	Continuous rotation stop
76–100	Continuous variable-speed clockwise image rotation around Z-axis (slow to fast)

This parameter lets you view an object from a different angle by turning the object. You can also view an object from a different angle by changing the viewpoint in space for the composite image, (see *Global Viewpoint Mode* on page 98).

Tip: Using this parameter you can turn one object around another



Original Object 1 and Object 2



Z-axis Rotation Applied to Object 2

Scaling the Object

You can scale an Graphic Object along the X, Y and/or Z axis to adjust the object size.

The Scale parameter adjusts the size of the object's image up to approximately 10x its original size. At a DMX value of zero, the image shrinks to a dot. At the midpoint of the DMX value range, the image is normal size. When the DMX value is increased from the midpoint, the image is enlarged. In addition, when the DMX value is reduced below the midpoint, an inverted image is enlarged.

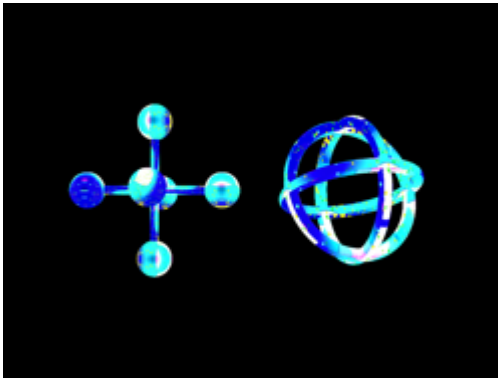
Use the **X**,**Y** and **Z Scale** parameters together to enlarge or shrink a 3-D object proportionally.

X Scale

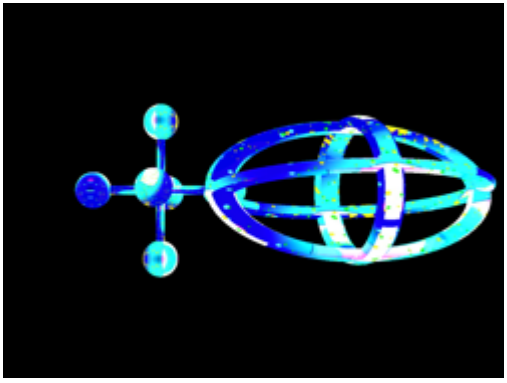
The **X Scale** parameter scales the selected 3-D object along the x axis, either expanding it or making it smaller. Use it when you want to size the object's horizontal component.

A DMX value of 128 (50%) sets the object at its normal size. Values less than 50% shrink the object horizontally to the smallest at 0. Values greater then 50% enlarge the object horizontally to the largest at 255 (100%).

Default DMX Value: 128 (50%) = Normal Scale



Original Object 1 and Object 2
All Scale DMX values = 128 (50%)



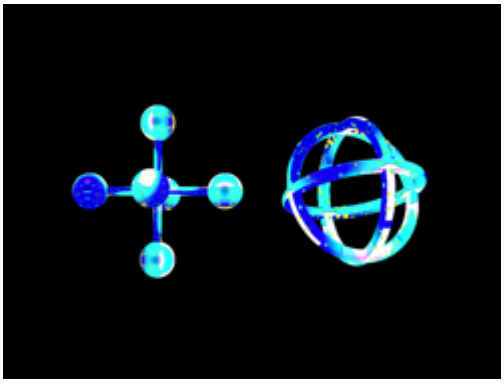
Object 2 X-Scale DMX value = 165
Scaled 3 times in X direction

Y Scale

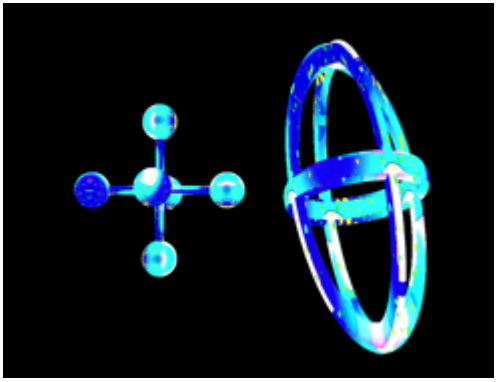
The **Y Scale** parameter scales the selected 3-D object along the y axis, either expanding it or making it smaller. Use it when you want to size the object's vertical component.

A DMX value of 128 (50%) sets the object at its normal size. Values less than 50% shrink the object vertically to the smallest at 0. Values greater then 50% enlarge the object vertically to the largest at 255 (100%).

Default DMX Value: 128 (50%) = Normal Scale



Original Object 1 and Object 2
All Scale parameters DMX values = 128 (50%)



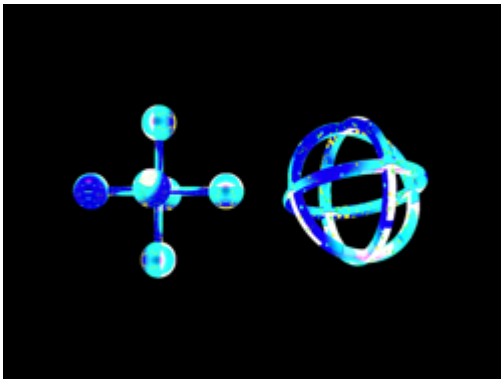
Object 2 Y-Scale parameter DMX value = 165
Scaled 3 times in Y direction

Z Scale

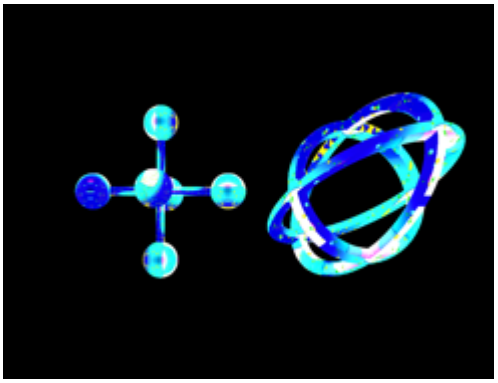
The **Z Scale** parameter scales the selected 3-D object along the z axis, either expanding or shrinking it. Use it when you want to size the object's thickness.

A DMX value of 128 (50%) sets the object at its normal size. Values less than 50% shrink the the object thickness until it reaches a point at a value of 0. Values greater then 50% enlarge the object to a maximum thickness at 255 (100%).

Default DMX Value: 128 (50%) = Normal Scale



Original Object 1 and Object 2
All Scale parameters DMX values = 128 (50%)



Object 2 Z-Scale parameter DMX value = 223
Scaled 7.5 times in Z direction

Changing Object Position

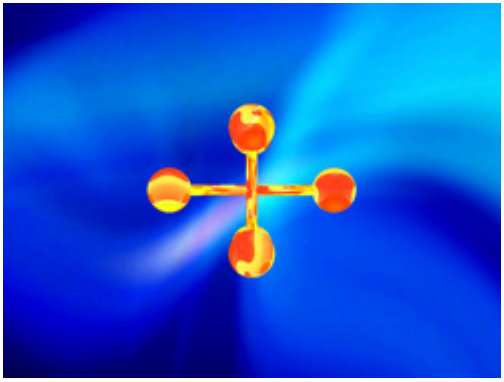
You can reposition each 3-D object's position in 3-D space by moving it along the X, Y and Z axes. The following parameters act on an individual object. Use these parameters to position 3-D images in relation to each other.

X Position

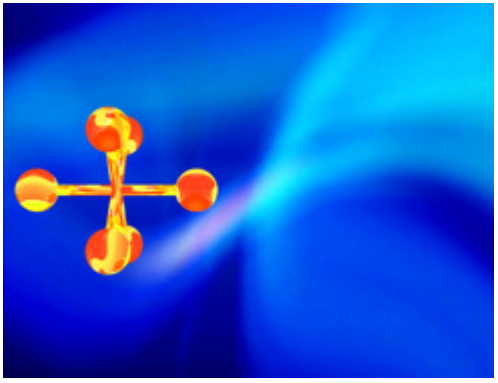
The **X Position** parameter moves your object along the x axis with 16-bit precision.

The midpoint of the 16-bit DMX value range centers the image on the X-axis. Values below the DMX midpoint move the object left, and values above the DMX midpoint move the object right.

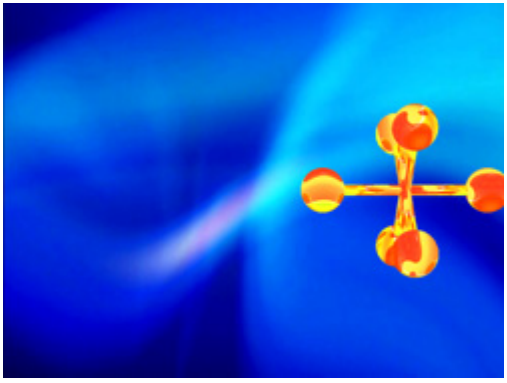
Default DMX Value: 32768 (50%) = object centered in frame



Original Object 1 and Object 2
All Position DMX values = 32768 (50%)



Object 1: X Position DMX value = 32022



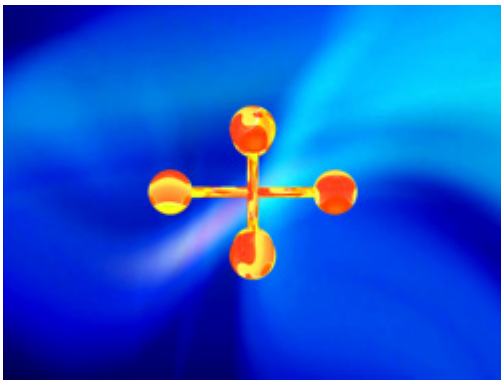
Object 1: X Position DMX value = 33561

Y Position

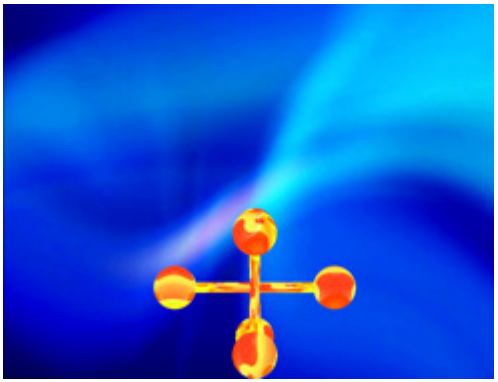
The **Y Position** parameter moves your object along the y axis with 16-bit precision.

The midpoint of the 16-bit DMX value range, centers the image on the Y-axis. Values below the DMX midpoint move the object down, and values above the DMX midpoint move the object up.

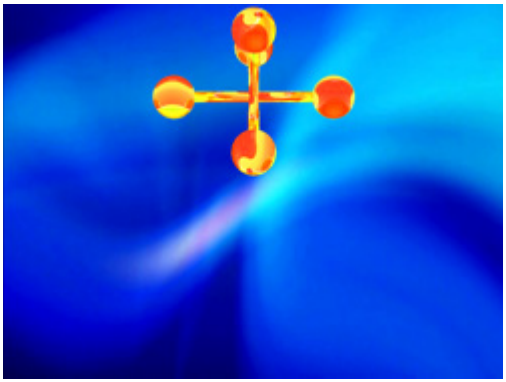
Default DMX Value: 32768 (50%) = object centered in frame



Original Object 1 and Object 2
All Position DMX values = 32768 (50%)



Object 1: Y Position DMX value = 32255



Object 1: Y Position DMX value = 33269

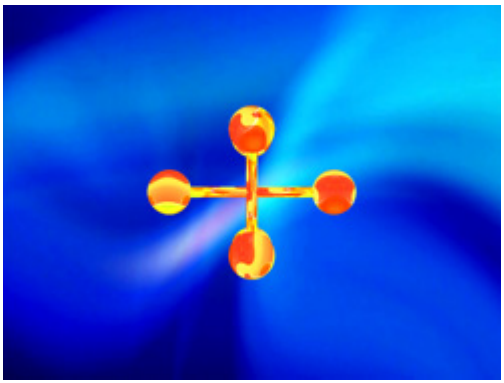
Z Position

The **Z Position** parameter moves your object along the z axis with 16-bit precision.

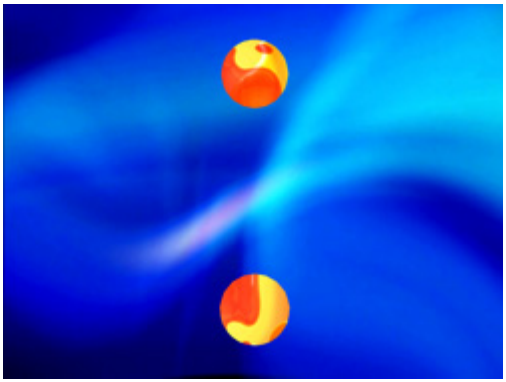
The midpoint of the 16-bit DMX value range centers the object on the z-axis. Values below the DMX midpoint move the object away from the viewer and appears to become smaller, and object above the DMX midpoint move the object toward the viewer and appears to become larger.

Default DMX Value: 32768 (50%) = object centered in frame

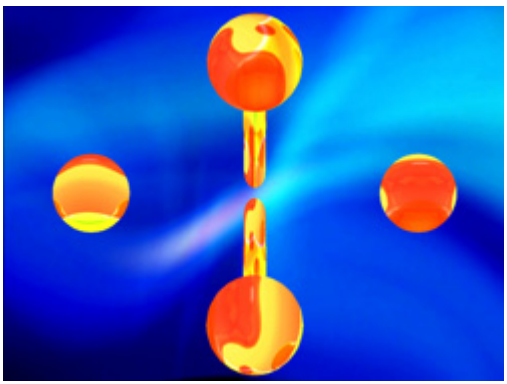
Tip: This parameter can create a zoom effect. Remember that by moving an object, you can obscure other objects or move it behind your viewpoint where it is no longer visible.



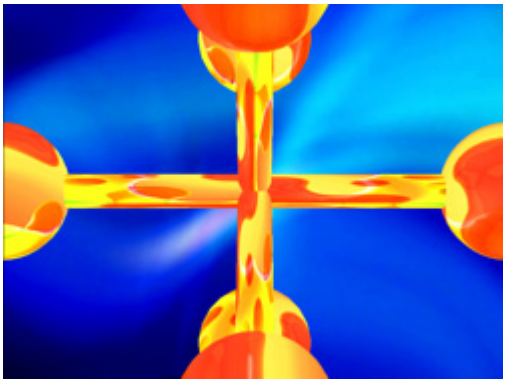
Original Object 1 and Object 2
All Position DMX values = 32768 (50%)



Object 1: Z Position DMX value = 31884



Object 1: Z Position DMX value = 32822



Object 1: Z Position DMX value = 33144

Chapter 8:

Graphic Functions: Opacity and Effects

You can adjust opacity and apply a variety of color mixing and geometric effects to each individual Graphic Object.

The parameters described in this chapter are set for each Graphic Object you define. Parameters for composite image intensity and effects are described in *Chapter 10: Global Functions*.

Note: ***The suggested default DMX values given for each parameter are recommended to build libraries that provide the easiest and most reliable content selection, rendering and output.***

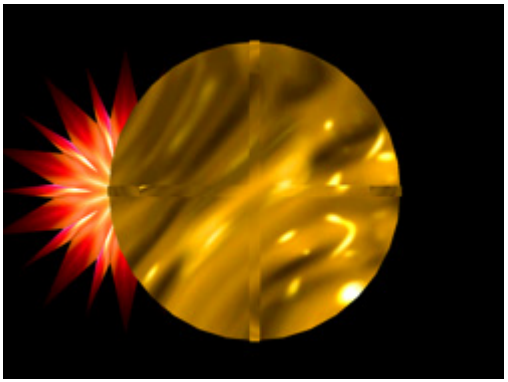
Opacity

Adjusting an object's opacity allows one object to "show through" another. You can adjust the opacity of an individual 3-D object from completely transparent to full opacity using this parameter. Increase opacity from not visible at a value of zero to full opacity at a value of 255.

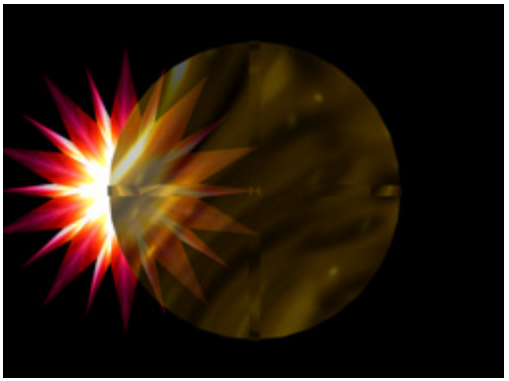
Default DMX Value: 0 = completely transparent

The Global Intensity parameter provides a similar adjustment to the combined image. This global control parameter controls intensity levels on the overall image (see *Global Intensity* on page 85). When you have multiple objects in relation to each other, the Global Intensity parameter is the best way to apply a fade to the composite image.

Tip: The **Dimmer**, **Object Opacity** and **Global Intensity** parameters all have to be greater than 0 to make a defined image visible.



Graphic Object 1 Intensity DMX = 255 (100%)
Graphic Object 2 Intensity DMX = 255 (100%)



Graphic Object 1 Intensity DMX = 255 (100%)
Graphic Object 2 Intensity DMX = 179 (70%)

Visual Mode

Visual Mode options are defined using three parameters. The **Visual Mode** parameter has options for enhancing and adjusting the black level and contrast of a 3-D object. Once you choose a visual mode, two **Modifier** parameters adjust the selected mode.

> ***Note:*** ***In most cases, you won't see a change in the content until you adjust the Modifier parameters for that mode.***

Default DMX Value: 0 = Safe (no processing applied)

Default DMX values for Modifier 1 and Modifier 2 channels depend on the selected option.

The following table illustrates the interaction between the Visual Mode Parameter and the two associated Modifier parameters for each option.

Visual Mode Option			Adjustments	
DMX Value	**Name**	**Description**	**Modifier 1**	**Modifier 2**
0	**Safe**	No visual mode processing applied to rendered output.	Not Used	Not Used
1	**Content Optimization**	Enhances image black level and contrast	Adjusts Back Level	Adjusts Contrast
2	**Push to Sepia**	Fades from original image color to sepia	Adjusts Fade	Adjusts Saturation
3	**Push to Red**	Fades from original image color to red tones	Adjusts Fade	Adjusts Saturation
4	**Graymaker**	Gradually transitions image from color to grayscale	Replaces color with gray	Adjusts brightness
5	**Graymaker2**	Converts image to grayscale	Adjusts black level	Adjusts contrast
6	**Posterizer**	Converts colors to their highest values without bleeding or blending	Reduces color detail	Adjusts Contrast
7	**Color to B/W**	Fades colors to black/white with no grays	Fades color through B/W to White at 100%	Not Used
8	**Fire Gradient**	Maps original color intensity levels to a red-to-yellow gradient.	Fades image to red-yellow gradient	Not Used
9	**Negative Art**	Reverses image color	Scales color	Subtract red to Subtract Green
10	**Exposure Control**	Alternate content optimization option	Expand/Contrast Color	Adjusts color shift
11	**Invert B/W**	Inverts Black and White components. Color remains unaffected	Sets Black Comparison Level	Sets White Comparison Level
12	**Texture Mixing**	Crossfades between the current image and another graphic object texture.	Selects the Source Graphic Object Texture	Controls Crossfade

Visual Mode Option			Adjustments	
DMX Value	**Name**	**Description**	**Modifier 1**	**Modifier 2**
13	**Image Scale and Rotate**	Scales and rotates the media file texture applied to a 3-D object	Scales Image	Sets Rotation Angle
14	**Film Roll**	Scrolls the media file texture horizontally or vertically	Sets Horizontal Roll Speed	Sets Vertical Roll Speed
15	**Pixelate**	Divides the image into rectangles using the center pixel color of each “box” as it’s color	Adjusts amount of pixelation	Not Used
16	**Faux LED**	Divides the image into a grid of circles to mimic an LED wall	Varies grid from 100x100 to 10x10	Varies the spacing and B/W
17	**Faux Tile**	Divides the image into square tiles	Varies grid from 100x100 to 10x10	Varies the spacing and B/W
18	**Fuzzifier**	Creates a multi-image blurring effect	Horizontal fuzz distance	Vertical fuzz distance
19	**Drop Shadow**	Creates a scalable drop shadow behind the graphic object	Horizontal shadow size	Vertical shadow size
20	**Zoom Blur**	Zooms into a position on the image with a mult-image blurring effect	Sets horizontal position center	Sets vertical position center
21	**Chroma Shift**	Shifts the red, blue, and green component colors	Horizontal shift	Vertical shift
22	**ShakeNBake**	Introduces a random vibration effect	Horizontal shake	Vertical shake
255	**Pan and Scan**	Zooms in and pans across a still image	Horizontal position	Vertical position

Visual Mode Options

Color to B/W

Visual Mode Parameter DMX value = 7

Begins with a white screen and fades to the original image in black and white. All color is converted.

Modifier 1: Transitions the image from full white at a DMX value of 0 to black and white at a value of 128 (50%). Increasing values above 50% reveals more of the image in black and white to complete at a value of 255 (100%).

Modifier 2: Not Used

Content Optimization

Visual Mode Parameter DMX value = 1

Stock content provided by High End Systems on your DL.2 fixture has been optimized for lighting applications. This option lets you make the same adjustments for User content or camera input. Content Optimization adjusts the image Black level and Contrast to optimize the projected image for your performance environment. You can use it to easily modify the black level and contrast for a specific application. The Exposure Control option provides an alternative algorithm for accomplishing this optimization.

Modifier 1: Adjusts black level from 0 = no adjustment to 255 (100%) = full black.

Modifier 2: Adjusts contrast from 0 = no adjustment to 255 (100%) for maximum contrast.

Tip: All the factory content provided has been optimized already. This parameter is especially useful for optimizing User content or camera capture.

Chroma Shift

Visual Mode Parameter DMX value = 21

Shifts the red, blue, and green component colors in an image. You can offset color components vertically and or horizontally.

Modifier 1: The default DMX value of 128 (50%) = no adjustment. Values below the midpoint shift the color components right to a maximum at a value of 0. Values above the midpoint shift the color components left to a maximum at a value of 255 (100%).

Modifier 2: The default DMX value of 128 (50%) = no adjustment. Values below the midpoint shift the color components down to a maximum at a value of 0. Values above the midpoint shift the color components up to a maximum at a value of 255 (100%).

Original Content
Visual Mode Parameter DMX value = 21

Visual Mode Modifier 1 DMX value=105
Visual Mode Modifier 2 DMX value=148

Drop Shadow

Visual Mode Parameter DMX value = 19

You can create a drop shadow behind the media file texture on a 3D object, and vary it's size horizontally and vertically. This option creates a black plane behind the selected media file texture on a flat rectangular object that can be positioned to form a drop shadow effect. You won't see the shadow until you select a Modifier 1 or 2 DMX value above or below 128 (50%)

Modifier 1: The default DMX value of 128 (50%) = no adjustment. Values below the midpoint move the "shadow" right as you approach 0 = maximum horizontal shadow width. Values above the midpoint move the "shadow" left as you approach 0 = maximum horizontal shadow width. at a value of 255 (100%)

Modifier 2: The default DMX value of 128 (50%) = no adjustment. Values below the midpoint move the "shadow" down as you approach 0 = maximum vertical shadow width. Values above the midpoint move the "shadow" up as you approach 0 = maximum vertical shadow width. at a value of 255 (100%)

Original Content
Visual Mode Parameter DMX value = 19

Visual Mode Parameter DMX value = 19
Visual Mode Modifier 1 DMX value= 0
Visual Mode Modifier 2 DMX value=255

Exposure Control

Visual Mode Parameter DMX value = 10

Exposure Control adjusts the image Black level and Contrast to optimize the projected image for your performance environment. You can use it to easily modify the black level and contrast for a specific application.

Exposure Control provides finer Contrast and Black level control than the Content Optimization option which pushes colors to saturation more quickly.

Modifier 1: Adjusts black level from 0 = full black through 255 (100%) = brightest. At a DMX value of 128 (50%) there is no adjustment.

Modifier 2: from 0 = least contrast through 255 (100%) = maximum contrast. At a DMX value of 128 (50%) there is no adjustment.

Tip: All the factory content provided has been optimized already. This parameter is especially useful for optimizing user content or camera capture.

Faux LED

Visual Mode parameter DMX value = 16

This options divides the image into a grid of circles to mimic an LED wall. The color of the center pixel in each cell defines the solid color for that circle. You can control the number and spacing of LEDs, choose between a black and white grid and adjust color peaking.

Modifier 1: Controls the number of LEDs. The default DMX value of 0 = a 10 x 10 grid of tiles. Increasing the DMX value increases grid divisions to a maximum of 100 x 100 tiles at a value of 255 (100%).

Note: A small number of larger tiles will also result in reduced color variation.

Modifier 2: Adjusts the LED spacing. DMX values below the midpoint of the range increase the spacing between tiles on a black background from O to a maximum space between tiles at a DMX value of 127. Values above the midpoint increase the spacing between tiles on a white background to a maximum space between tiles at a DMX value of 255 (100%).

Original Content

Visual Mode Parameter DMX value = 16
Modifier 1 =4, Modifier 2 = 76

Visual Mode Parameter DMX value = 16
Modifier 1 = 204, Modifier 2 = 16

Faux Tile

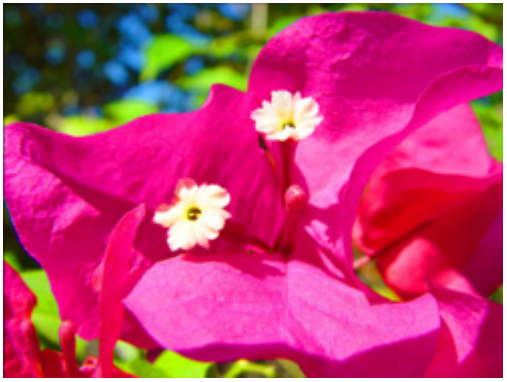
Visual Mode parameter DMX value = 17

This options creates divides the image into a grid of tiles with simulated lighting at the edges. The color of the center pixel in each cell defines the solid color for that tile. You can the number and spacing of tile, choose between a black and white grid and adjust color peaking.

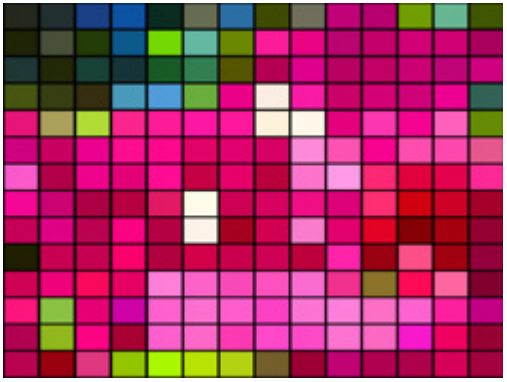
Modifier 1: Controls the number of tile. The default DMX value of 0 = a 10 x 10 grid of tiles. Increasing the DMX value increases grid divisions to a maximum of 100 x 100 tiles at a value of 255 (100%).

Note: A small number of larger tiles will also result in reduced color variation.

Modifier 2: Adjusts the grid thickness around each tile. DMX values below the midpoint of the range increase the spacing between tiles on a black background from O to a maximum space between tiles at a DMX value of 127. Values above the midpoint increase the spacing between tiles on a white background to a maximum space between tiles at a DMX value of 255 (100%).



Original Content



Visual Mode Parameter DMX value = 17
Modifier 1 =255 (100%), Modifier 2 = 0

Visual Mode Parameter DMX value = 17
Modifier 1 =255 (100%), Modifier 2 = 138

Film Roll

Visual Mode parameter DMX value = 14

This option scrolls the media file texture horizontally or vertically independent from the 3-D object it overlays, and allows you to control the scrolling speed.

Modifier 1: The default DMX value of 128 (50%) = no adjustment. Values below the midpoint scroll left, increasing in speed as you approach 0. Values above the midpoint scroll right, increasing in speed to 255 (100%).

Modifier 2: The default DMX value of 128 (50%) = no adjustment. Values below the midpoint scroll down, increasing in speed as you approach 0. Values above the midpoint scroll up, increasing in speed to 255 (100%).

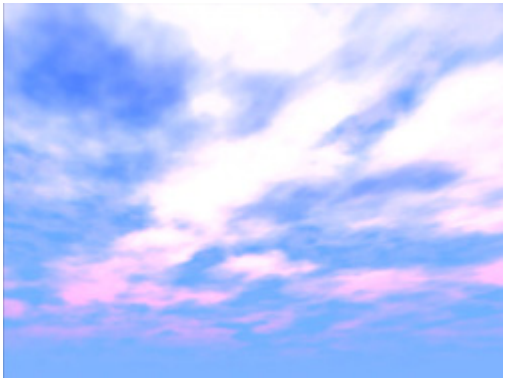
Fire Gradient

Visual Mode Parameter DMX value = 8

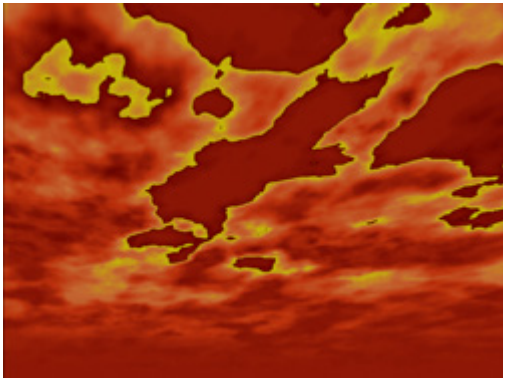
This option maps image colors to a Red-to-Yellow gradient creating a fiery effect.

Modifier 1: Maps the image color values from no adjustment at a value of 0 to all red to yellow tones at a value of 255 (100%).

Modifier 2: Not Used



Original Content



Visual Mode Parameter DMX value = 8
Visual Mode Modifier 1 DMX value=255 (100%)

Fuzzifier

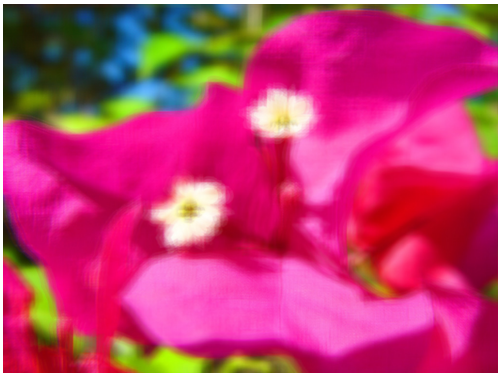
Visual Mode parameter DMX value = 18

This option blurs the media file texture horizontally or vertically independent from the 3-D object it overlays, and allows you to control the scrolling speed and image scaling.

Modifier 1: The default DMX value of 0 = no adjustment. Increasing DMX values blur the image horizontally to a maximum at a DMX value of 255 (100%).

Modifier 2: The default DMX value of 0 = no adjustment. Increasing DMX values blur the image vertically to a maximum at a DMX value of 255 (100%).

Original Content
Visual Mode Parameter DMX value = 18



Visual Mode Modifier 1 DMX value=255 (100%)
Visual Mode Modifier 2 DMX value=255 (100%)

Gray maker I

Visual Mode Parameter DMX value = 4

This effect gradually transitions the color image to a grayscale image. Use the Gray Maker effect when you want to add an undertone of grey to the colors in an image.

NOTE: If content is already grayscale, there is no effect applied but Modifier 2 can still effect image contrast.

Modifier 1: At a DMX value of 0, the image will be full color. As you increase the DMX value, more gray is introduced until, at a DMX value of 255, all color has been replaced with shades of gray.

Modifier 2: Adjusts the brightness of the image at the grayscale transition level selected with the Modifier 1 parameter.

Original Content
Visual Mode Parameter DMX value = 4

Visual Mode Parameter DMX value = 4
Visual Mode Modifier1 DMX value=128(50%)

Visual Mode Parameter DMX value = 4
Visual Mode Modifier1 DMX value=190(75%)
Visual Mode Modifier2 DMX value=255(100%)

Gray maker 2

Visual Mode Parameter DMX value = 5

This option converts a color image to grayscale and then lets you adjust black level and contrast.

NOTE: If content is already grayscale, there is no effect applied but Modifier 2 can still affect image contrast.

Modifier 1: Adjusts the black level of the grayscale image from a DMX value of 0 = Full brightness to 255 = completely black

Modifier 2: Adjusts contrast of the grayscale image from 0 = no adjustment to 255 (100%) = maximum contrast.

Original Content

Visual Mode Parameter DMX value = 4

Visual Mode Parameter DMX value = 4
Visual Mode Modifier1 DMX value=90(33.3%)
Visual Mode Modifier2 DMX value=175(77%)

Invert Black and White, Keep Color

Visual Mode Parameter DMX value = 11

This option allows you to invert the black and white components of an image while leaving other colors unaffected. You can vary the threshold for the "black" in a pixel required for inversion.

Modifier 1: Adjusts the comparison level of black for inversion from a DMX value of 0= inverting only absolute black to 255 (100%) = converting more of the image from black to white.

Modifier 2: Adjusts the comparison level of white for inversion from a DMX value of 0= inverting only absolute white to 255 (100%) = converting more of the image from white to black.

Negative Art

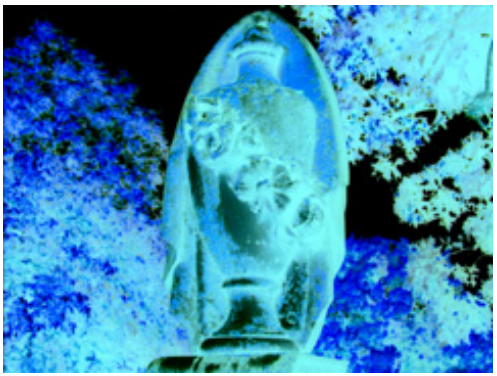
Visual Mode Parameter DMX value = 9

This option provides a negative of the image and then lets you adjust the amount of color and the red and green color components.

Modifier 1: Adjusts the color level from full at a DMX value of 0 to the lowest level at a DMX value of 255.

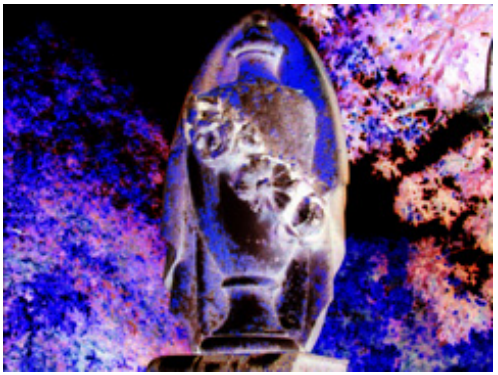
Modifier 2: You must set a DMX value of 128 to see no black level adjustment. Red is subtracted from the image at DMX values of 128 to 0. Green is subtracted from the image at DMX values of 129 – 255.

Original Content



Visual Mode Parameter DMX value = 9
Modifier 1 DMX value=0
Modifier 2 DMX value = 0

Visual Mode Parameter DMX value = 9
Modifier 1 DMX value=0
Modifier 2 DMX value = 128 (50%)



Visual Mode Parameter DMX value = 9
Modifier 1 DMX value=255 (100%)
Modifier 2 DMX value = 128 (50%)

Pan and Scan

Effect Mode parameter DMX value = 255

This option Zooms into a still image and then, by changing position, you can pan across the image horizontally and vertically. It only functions on image sizes greater than 1024 x 1024 in at least one direction.

Modifier 1: Adjusts the horizontal pan position from 0=left edge to 255 (100%) = right edge of the image. The default DMX value of 128 (50%) = no adjustment.

Modifier 2: Adjusts the vertical pan position from 0 = bottom edge to 255 (100%) = top edge of the image. The default DMX value of 128 (50%) = no adjustment.

Original Content

Visual Mode Parameter DMX value = 255
Modifier 1 DMX value=128
Modifier 2 DMX value = 128

Visual Mode Parameter DMX value = 255
Modifier 1 DMX value=0
Modifier 2 DMX value = 0

Visual Mode Parameter DMX value = 9
Modifier 1 DMX value=255
Modifier 2 DMX value = 255

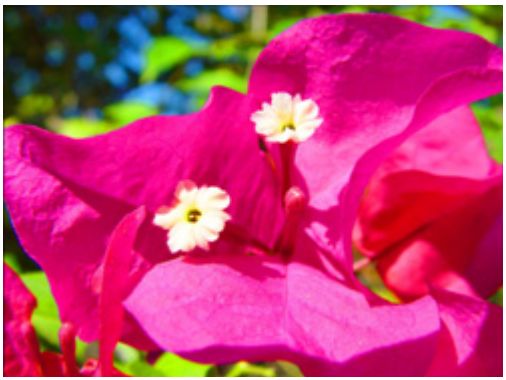
Pixelate

Effect Mode parameter DMX value = 15

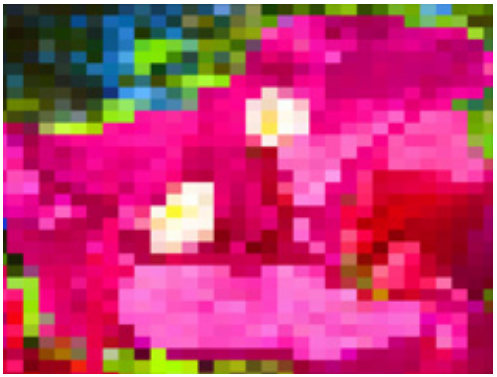
This options divides the image into rectangles using the center pixel color of each as it's color. You can control the number of divisions.

Modifier 1: Controls the number of divisions from the fewest number of cells as Since each division is a single color, fewer, larger boxes result in reduced color variation.

Modifier 2: Not Used



Original Content
Visual Mode Parameter DMX value = 15



Visual Mode Modifier 1 DMX value = 128

Posterizer

Visual Mode Parameter DMX value = 6

This effect uses the associated **Modifier 1** parameter to posterize by replacing each color in an image with the highest values of that color but expanding it only to the border of that color. There is no bleeding or blending of colors.

> ***Note:*** ***In this visual mode, you won't see a change in the image until you adjust the Modifier 1 parameter***

Modifier 1: Adjusts color polarization level. The higher the value, the more color detail will be removed.

Modifier 2: Adjust the image contrast from 0 = no adjustment to 255 (100%) = maximum contrast.

Original Content
Visual Mode Parameter DMX value = 6

Visual Mode Parameter DMX value = 6
Visual Mode Modifier2 DMX value=255(100%)

Visual Mode Parameter DMX value = 6
Visual Mode Modifier1 DMX value=190(75%)
Visual Mode Modifier2 DMX value=255(100%)

Push to Red

Visual Mode Parameter DMX value = 3

This option reduces colors in the selected image to all Red values

Modifier 1: Fades from original color at a DMX value = 0 to a range of red tones at a value of 255 (100%)

Modifier 2: Adjusts color saturation from no adjustment at a DMX value = 0 to full saturation at a value of 255 (100%)

Original Content
Visual Mode Parameter DMX value = 3

Visual Mode Parameter DMX value = 3
Visual Mode Modifier2 DMX value=255(100%)

Visual Mode Parameter DMX value = 3
Visual Mode Modifier1 DMX value=190(75%)
Visual Mode Modifier2 DMX value=255(100%)

Push to Sepia

Visual Mode Parameter DMX value = 2

This option converts all color in the image to sepia tones.

Modifier 1: Fades from original color at a DMX value = 0 to a range of sepia shades at a value of 255 (100%)

Modifier 2: Adjusts color saturation from no adjustment at a DMX value = 0 to full saturation at a value of 255 (100%)

Original Content
Visual Mode Parameter DMX value = 2

Visual Mode Parameter DMX value = 2
Visual Mode Modifier2 DMX value=255(100%)

Visual Mode Parameter DMX value = 2
Visual Mode Modifier1 DMX value=190(75%)
Visual Mode Modifier2 DMX value=255(100%)

ShakeNBake

Visual Mode Parameter DMX value = 22

This option randomly vibrates the image. You can control the horizontal and vertical frequency.

Modifier 1: Adjusts random horizontal "shake" frequency from 0= no adjustment to 255 (100%) = maximum.

Modifier 2: Adjusts random vertical "shake" frequency from 0= no adjustment to 255 (100%) = maximum.

Texture Mixing

Visual Mode Parameter DMX value = 12

Texture Mixing lets you crossfade from textures (media file content) of one Graphic Object to the texture of another Graphic Object. Any effects applied to the Source file do not display.

Modifier 1: Selects the Source file for the texture you want to pull. A DMX value = 1 selects Graphic Object 1's media file content. A DMX value = 2 selects Graphic Object 2's media file content. A DMX value =3 selects Graphic Object 3's media file content.

Modifier 2: Adjusts Graphic Object opacity of the source texture from a DMX value of 0 = fully transparent to 255 (100%) = fully opaque.

Zoom Blur

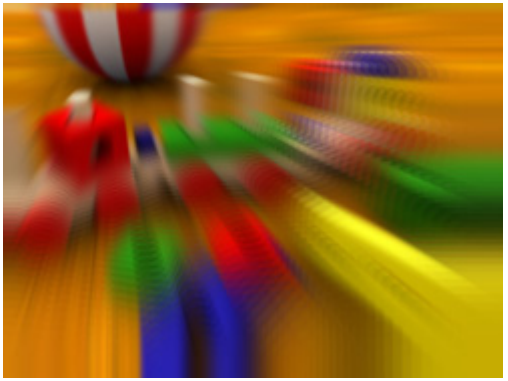
Visual Mode Parameter DMX value = 22

Zooms into a position on the image with a mult-image blurring effect. You can control the position of the zoom center on the image.

Modifier 1: Selects the horizontal center of the zoom point.

Modifier 2: Selects the vertical center of the zoom point.

Original Content
Visual Mode Parameter DMX value = 20



Visual Mode Modifier 1 DMX value=158
Visual Mode Modifier 2 DMX value=168

Effect 1 Mode and Effect 2 Mode

Two **Effect Mode** parameters are available for each individual 3-D object, each with three **Modifier** parameters. Both Effect parameters have an identical list of color and visual effect options. This lets you apply a dual-effect combination to the selected 3-D object.

Note: ***Not all modes combine effectively. For example, you cannot glow a wobbulating object very well.***

The table below describes the interaction between an Effect Mode parameter and its three associated Modifier parameters. You can find a detailed description and example of each option in *Chapter 11: Effect Mode Descriptions*.

Note: ***Modifier channels for Effect Mode 1 are labeled as CMY in the Wholehog 3 system so you can also make use of the color picker, HSI, and other Wholehog 3 functions. Use the CMY parameter controls to adjust the three Effect Mode 1 Modifier parameters for both the Global and Graphic fixture types. The default for Effect Mode 1 is set to CMY1 as well. Effect Mode 2 Modifier channels are labeled Mod 1, Mod 2, and Mod 3.***

DMX Value	Effect Mode	Adjustments		
	Name/Definition	**Modifier 1**	**Modifier 2**	**Modifier 3**
0	**Safe**, no effects selection	NA	NA	NA
1	**CMY** (RGB inverse)	Cyan	Magenta	Yellow
2	**CMY add to all pixels**	Cyan	Magenta	Yellow
3	**CMY add to all non-black pixels**	Cyan	Magenta	Yellow
4	**RGB add, all pixels**	Red	Green	Blue
5	**RGB add 2, all pixels**	Red	Green	Blue
6	**RGB add to all non-black pixels**	Red	Green	Blue
7	**RGB swap to GBR**	Red to Green	Green to Blue	Blue to Red
8	**RGB swap to BRG**	Red to Blue	Green to Red	Blue to Green
9	**Solarize 1** If color value < DMX value, invert color	Red	Green	Blue
10	**Solarize 2** If color value > DMX, invert color	Red	Green	Blue
11	**Solarize 3** If color value < DMX, set color to 0	Red	Green	Blue
12	**Solarize 4** If color value > DMX, set color to 0	Red	Green	Blue
13	**DotP and resample**	Red	Green	Blue
14	**Color cycle** DMX value controls cycle speed	Red	Green	Blue
15	**All or Nothing** If color value > mod value color = 255, else color = 0	Red	Green	Blue
16	**RGB, Solid color**	Red	Green	Blue
17	**RGB, Invert**	Red to Cyan	Green to Magenta	Blue to Yellow

DMX Value	Effect Mode	Adjustments		
	Name/Definition	**Modifier 1**	**Modifier 2**	**Modifier 3**
18	**RGB, Invert and Swap to GBR**	Red to Magenta	Green to Yellow	Blue to Cyan
19	**RGB, Invert and Swap to BRG**	Red to Yellow	Green to Cyan	Blue to Magenta
20	**Edge Detect Color**	Horizontal search size	Vertical search size	Comparison threshold
21	**Edge Detect B/W**	Horizontal search size	Vertical search size	Comparison threshold
22	**Texture Ripple, Horizontal**	Amplitude	Frequency	Phase
23	**Texture Ripple, Vertical**	Amplitude	Frequency	Phase
24	**Texture Ripple, Circular**	Amplitude	Frequency	Phase and Direction
25	**Texture Ripple, Asymmetrical Circular**	Amplitude	Frequency	Phase
26	**Chromakey, Fine**	Red	Green	Blue
27	**Chromakey, Medium**	Red	Green	Blue
28	**Chromakey, Coarse**	Red	Green	Blue
29	**Chromakey Fine, Inverse**	Red	Green	Blue
30	**Chromakey Medium, Inverse**	Red	Green	Blue
31	**Chromakey Coarse, Inverse**	Red	Green	Blue
32	**Scan line** converts image colors to colors in a single line of the image	selects scan line	fades to converted image	Not Used
33	**Transparent Wipes** “opens” the selected graphic to reveal another graphic positioned behind it	Area of wipe	Selects center of wipe	Selects from 6 wipe options
34	**Pixel Twist** swirls a portion of the texture	x- twist center	y-twist center	Sets twist direction and degree
35	**Picture-in-picture** duplicates the texture and overlays it on the original	x subpicture center	y subpicture center	subpicture size
36	**Magnifying lens** applies spherical overlay that magnifies a portion of the texture	X lens center	Y lens center	Lens size
37	**Magnifying lens 2** applies spherical overlay that magnifies a portion of the texture.	X lens center	Y lens center	Lens size
38	**Cartoon Edge** creates variable outline around picture elements	Reduces Color	Enhances Contrast	Edge detection sensitivity
39	**Color DeConverge** offsets pixels from original position	Moves Red pixels up	Moves Green Pixels down and right	Moves Blue Pixels down and left
40	**Horizontal Mirror** creates a mirror effect	Defines mirror center	Not Used	Not Used

DMX Value	Effect Mode	Adjustments		
	Name/Definition	**Modifier 1**	**Modifier 2**	**Modifier 3**
41	**RGB swap to BGR**	Red to Blue	Green	Blue to Red
42	**RGB swap to RBG**	Red	Green to Blue	Blue to Green
43	**RGB swap to GRB**	Red to Green	Green to Red	Blue
44	**Colorize Gray Scale** maps pixel intensity to color	Selects Color Scheme	Selects zero intensity point	Controls fading
45	**Intensity key** turns pixels of selected intensity transparent	Selects Color Scheme	Defines Intensity bandwidth	Controls Transparency
46	**Raindrop** simulates raindrops falling on a liquid surface	Controls size/speed	Seeds random # generator	Controls raindrop rate
47	**RGB, Scale** varies color value	Red	Green	Blue
48	**Tiling On**	x-axis scaler	y-axis scaler	NA
49	**Color to Alpha** varies the transparency level of an image's component color values.	Red to alpha	Green to alpha	Blue to alpha
50	**Color to Alpha,** Inverted varies the transparency level of the inverse of an image's component color values.	Inverted red to alpha	Inverted green to alpha	Inverted blue to alpha
51	**Texture Mixing** Crossfades between the current image and another graphic object texture.	Selects Source Texture	Selects Source Effect Level	Crossfade Between Textures
52	**Image Scale and Rotate** scales and rotates the media file texture applied to a 3-D object	Scales image	Selects Rotation Angle	Sets Rotation Speed
53	**Film Roll** scrolls the media file texture horizontally or vertically	Horizontal roll speed	Vertical roll speed	Scales Image
54	**Pixelate** divides the image into rectangles using the center pixel color of each "box" as it's color	Sets amount of Pixelation	Scales horizontally	Scales vertically
55	**Faux LED** divides the image into a grid of circles to mimic an LED wall	LED size	Spacing	Color peaking
56	**Faux Tile** divides the image into square tiles	Tile size	Spacing	Color peaking
57	**Fuzzifier** creates a multi-image blurring effect	Horizontal distance	Vertical distance	Fuzz decay
58	**Drop Shadow** creates a scalable drop shadow behind the graphic object	Horizontal shadow size	Vertical shadow size	Shadow opacity
59	**Zoom Blur** Zooms into a position on the image with a mult-image blurring effect	Horizontal position center	Vertical position center	Zoom in and out
60	**Chroma Shift** Shifts the red, blue, and green component colors	Horizontal shift	Vertical shift	Scale

DMX Value	Effect Mode	Adjustments		
	Name/Definition	**Modifier 1**	**Modifier 2**	**Modifier 3**
61	**ShakeNBake** Introduces a random vibration effect	Horizontal shake	Vertical shake	Scale
62	**Slats, Vertical** renders the image in offset vertical slats	Number of Slats	Vertical Displacement	Fade from Normal to Slats
63	**Slats, Horizontal** renders the image in offset horizontal slats	Number of Slats	Horizontal Displacement	Fade from Normal to Slats
64	**Sinewave, Circular with x-axis wobbulation**	Amplitude	Frequency	Phase
65	**Sinewave, Circular with y-axis wobbulation**	Amplitude	Frequency	Phase
66	**Sinewave, Circular with z-axis wobbulation**	Amplitude	Frequency	Phase
67	**Sinewave, Horizontal with x-axis wobbulation**	Amplitude	Frequency	Phase
68	**Sinewave, Horizontal with y-axis wobbulation**	Amplitude	Frequency	Phase
69	**Sinewave, Horizontal with z-axis wobbulation**	Amplitude	Frequency	Phase
70	**Sinewave, Vertical with x-axis wobbulation**	Amplitude	Frequency	Phase
71	**Sinewave, Vertical with y-axis wobbulation**	Amplitude	Frequency	Phase
72	**Sinewave, Vertical with z-axis wobbulation**	Amplitude	Frequency	Phase
73	**Glow** applies glow effect to 3-D object	Red	Green	Blue
74	**Glow Color Cycle**	Red cycle speed	Green cycle speed	Blue cycle speed
80	**Downward Vertical Streaks "**pulls" the image down	Vertical Start Position	Streak Angle	Fade from Normal to Streak
81	**Gaussian Blur**	Sample Distance	Number of Filter Passes	Gaussian Curve Shape
82	**Sharpen** enhances image detail	Sample Distance	Number of Filter Passes	Scale Sharpen Coefficient
253	**Spherical Mapping Adjustment 1**	Sets Projector's Vertical Offset	Sets Sphere's Vertical Offset	Adjusts Vertical View Size
254	**Spherical Mapping Adjustment 2**	Adjusts Vertical Geometry Correction	Sets Vertical Geometry Correction Center	Adjusts Horizontal View Size
255	**Pan and Scan** Zooms in and pans across a still image	Horizontal position	Vertical position	Zoom

Chapter 9:

Graphic Functions: Synchronizing Content

After designating a master fixture, you can synchronize the content of other Axon or DL.2 fixtures to any Object on the master in terms of playback time, rotation or both.

Synchronization Overview

Any Axon or DL.2 media server can synchronize playback between graphic objects projected from different servers on the same Ethernet network. Synchronization is not "Slaving". With "Slaving", the master's DMX values for the synchronized function(s) overrides (replaces) the slave DMX values. When synchronizing content for Axon or DL.2 fixtures, the appropriate DMX channels for all the "synced" fixtures and the "master" fixture must be set to the same values.

Fixture Identification

A fixture ID default of 1 is assigned to every DL.2 and Axon server on your Ethernet fixture network. For synchronization to work, you will need to assign each DL.2 and Axon server a Unique Fixture ID from 1 to 255 using the CMA (see **Viewing and Editing Server Configuration on page 174**) or through the onboard Menu System (DL.2 fixtures).

Playback Timing

Synchronizing playback sets all applicable fixtures to a ***master clock*** so that all fixtures have a definite, synchronized starting point when playing back their sequences (or loops). The master fixture determines the sequence length for all the other fixtures in the link, regardless of the number of programmed scenes or the sequence length of the individual fixtures synchronizing to the master.

When the master fixture reaches the end of the selected media file segment, all fixtures will restart at In Frame point of their media file segment (regardless of whether the playback has come to the selected Out Frame) and all the ***clocks*** will be reset to zero. For example, if a synchronizing fixture's media segment has a shorter sequence length than the master fixture's media file segment, it continuously repeats its sequence until the master fixture resets all the clocks. If a synchronizing fixture's media segment has a longer sequence length, it restarts at the In Frame point before completing its entire sequence.

Synchronization Parameters

Sync To

You use the **Sync To** parameter to identify the Media Server you want a Graphic Object output to Synchronize with. You can synchronize any graphic object output on one server to any other graphic object output on another server.

You can only synchronize output to one media server. However, you can synchronize outputs from multiple media servers to the same server. The Ethernet link can support multiple synchronizations at the same time.

Default DMX Value: 0 = No synchronization

Each fixture on the network is assigned a fixture ID. Currently, synchronization can be with only one media server. The Synchronization server is selected with the **Sync To** parameter channel of Graphic Object One. The **Sync To** parameter channels for Graphic Objects 2 and 3 are reserved and default to 0.

Sync Mode

The **Sync Mode** parameter defines the type of synchronization between Graphic Objects. You can synchronize to the frame of the movie, the 3-D object rotation either forward or reverse, or both.

When using the Sync Mode parameter, keep the following in mind:

- Any Sync Mode value above 15 (16-255) defaults back to 0
- Any settings affected by the synchronize mode you select need to be mirrored on both objects to Sync correctly.
- Setting a Graphic Object to sync to itself will have no effect.

DMX Default Value: 0 = no sync type selection

DMX Value	Option
0	No selection
1	Synchronize to Graphic Object 1 movie time
2	Synchronize to Graphic Object 2 movie time
3	Synchronize to Graphic Object 3 movie time
4	Synchronize to 3-D object rotation 1
5	Synchronize to 3-D object rotation 2
6	Synchronize to 3-D object rotation 3
7	Synchronize to reverse 3-D object rotation 1
8	Synchronize to reverse 3-D object rotation 2
9	Synchronize to reverse 3-D object rotation 3
10	Synchronize to Graphic Object 1 movie time and rotation 1
11	Synchronize to Graphic Object 2 movie time and rotation 2
12	Synchronize to Graphic Object 3 movie time and rotation 3
13	Synchronize to Graphic Object 1 movie time and reverse rotation 1
14	Synchronize to Graphic Object 2 movie time and reverse rotation 2
15	Synchronize to Graphic Object 3 movie time and reverse rotation 3

Chapter 10:

Global Functions

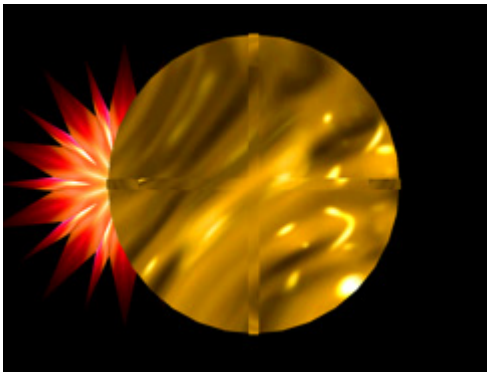
Global Graphic controls affect the composite image created by defining two or three separate object graphics. You can adjust intensity, define masks, select a point in space to view the composite image, and control keystone correction.

Global Intensity

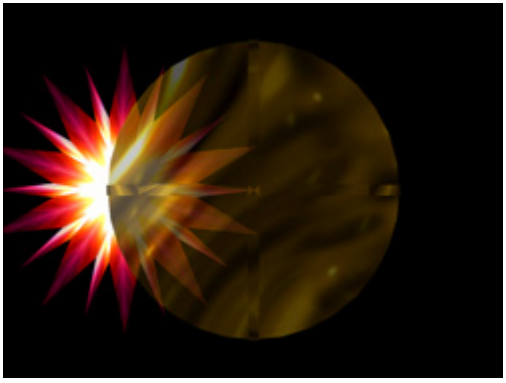
The **Global Intensity** parameter creates a smooth *fade to video black* that doesn't affect the opacity relationship between individual objects. Use this parameter to adjust the intensity of a composite image over the separate Graphic Object's Opacity parameter settings. Increase intensity from not visible at a DMX value of 0 to full intensity at a value of 255 (100%).

Default DMX Value: 0 = no intensity (video black)

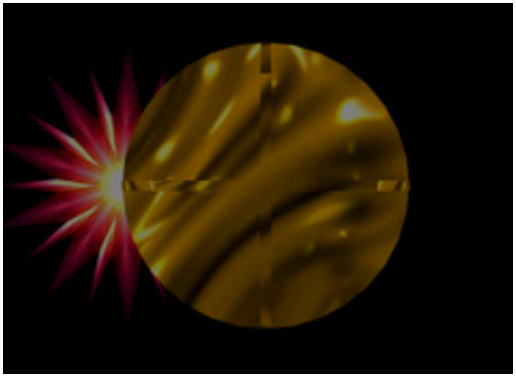
Tip: The Dimmer, Object Opacity and Global Intensity parameters all need DMX values greater than 0 for a defined image to be visible.



Graphic Object 1 Intensity DMX = 255 (100%)
Graphic Object 2 Intensity DMX = 255 (100%)



Graphic Object 1 Intensity DMX = 255 (100%)
Graphic Object 2 Intensity DMX = 179 (70%)



Global Intensity DMX = 128 (50%)

Global Effect Mode 1 and Effect Mode 2

There are two **Global Effect Mode** parameters, each with three modifier parameters. Both Effect Mode parameters have an identical list of color and visual effect options. This lets you apply a dual-effect combination to the composite image.

The table below describes the interaction between an Effect Mode parameter and the three associated Modifier parameters for each option. You can find a detailed description of each option in *Chapter 12: Effect Mode Options Descriptions*.

Note: ***Modifier channels for Effect Mode 1 are labeled as CMY in the Wholehog 3 system so you can also make use of the color picker, HSI, and other Wholehog 3 functions. Use the CMY parameter controls to adjust the three Effect Mode 1 Modifier parameters for both the Global and Graphic fixture types.***

The default for Effect Mode 1 is set to CMY1 as well. Effect Mode 2 Modifier channels are labeled Mod 1, Mod 2, and Mod 3.

Effect Mode		**Adjustments**		
DMX Value	**Name**/Description	**Modifier 1**	**Modifier 2**	**Modifier 3**
0	Safe, no effects selection	NA	NA	NA
1	CMY (RGB inverse)	Cyan	Magenta	Yellow
2	CMY Add, All Pixels	Cyan	Magenta	Yellow
3	CMY Add, All Non-black Pixels	Cyan	Magenta	Yellow
4	RGB Add, All Pixels	Red	Green	Blue
5	RGB Add 2, All Pixels	Red	Green	Blue
6	RGB Add, All Non-black Pixels	Red	Green	Blue
7	RGB Swap to GBR	Red to Green	Green to Blue	Blue to Red
8	RGB Swap to BRG	Red to Blue	Green to Red	Blue to Green
9	Solarize 1 If color value < DMX value, invert color	Red	Green	Blue
10	Solarize 2 If color value > DMX, invert color.	Red	Green	Blue
11	Solarize 3 If color value < DMX, set color to 0	Red	Green	Blue
12	Solarize 4 If color value > DMX, set color to 0	Red	Green	Blue
13	DotP and Resample	Red	Green	Blue
14	Color Cycle DMX value controls cycle speed.	Red	Green	Blue
15	All or Nothing If color value > mod value, color = 255, else color = 0	Red	Green	Blue
16	Solid color RGB	Red	Green	Blue
17	RGB Invert	From Red to Cyan	From Green to Magenta	From Blue to Yellow
18	RGB, Invert and Swap to GBR	Red to Green	Green to Blue	Blue to Red
19	RGB, Invert and Swap to BRG	Red to Blue	Green to Red	Blue to Green

Effect Mode		Adjustments		
DMX Value	**Name**/Description	**Modifier 1**	**Modifier 2**	**Modifier 3**
20	Edge Detect Color	Horizontal search size	Vertical search size	Comparison threshold
21	Edge Detect B/W	Horizontal search size	Vertical search size	Comparison threshold
22	Texture Ripple, Horizontal	Amplitude	Frequency	Phase
23	Texture Ripple, Vertical	Amplitude	Frequency	Phase
24	Texture Ripple, Circular	Amplitude	Frequency	Phase and Direction
25	Texture Ripple, Circular Asymmetrical	Amplitude	Frequency	Phase
26	Chromakey Fine, select key color using Modifier channels	Red	Green	Blue
27	Chromakey Medium, select key color using Modifier channels	Red	Green	Blue
28	Chromakey Coarse, select key color using Modifier channels	Red	Green	Blue
29	Chromakey Fine, Inverse select key color using Modifier channels	Red	Green	Blue
30	Chromakey Medium, Inverse select key color using Modifier channels	Red	Green	Blue
31	Chromakey Coarse, Inverse select key color using Modifier channels	Red	Green	Blue
32	Scan Line converts image colors to colors in a single line of the image	Selects scan line	Fades to converted image	Not used
33	Transparent Wipes “opens” the selected graphic to reveal another graphic positioned behind it	Area of wipe	Selects center of wipe	Selects from 6 wipe options
34	Pixel Twist swirls a portion of the texture	X twist center	Y twist center	Direction and amount of twist
35	Picture-in-picture duplicates the texture and overlays it on the original	X subpicture center	X subpicture center	Subpicture size
36	Magnifying Lens applies spherical overlay that magnifies a portion of the texture	X lens center	Y lens center	Lens size
37	Magnifying Lens 2 applies spherical overlay that magnifies a portion of the texture.	X lens center	Y lens center	Lens size
38	Cartoon Edge creates variable outline around picture elements	Reduces Color	Enhances Contrast	Edge detection sensitivity
39	Color DeConverge separates image color components and offsets them from original position	Moves Red component up	Moves Green component down and right	Moves Blue component down and left
40	Horizontal Mirror creates a mirror effect	Defines mirror center	Not Used	Not Used
41	RGB Swap to BGR redefines component color	Red to Blue	Green	Blue to Red
42	RGB Swap to RBG redefines component color	Red	Green to Blue	Blue to Green
43	RGB Swap to GRB redefines component color	Red to Green	Green to Red	Blue

Effect Mode		Adjustments		
DMX Value	**Name**/Description	**Modifier 1**	**Modifier 2**	**Modifier 3**
44	Colorize Gray Scale maps pixel intensity to color	Selects Color Scheme	Selects zero intensity point	Controls fading
45	Intensity key turns pixels of selected intensity transparent	Selects Color Scheme	Defines Intensity bandwidth	Controls Transparency
46	Raindrop simulates raindrops falling on a liquid surface	Controls size/ speed	Seeds random # generator	Controls raindrop rate
47	RGB, Scale varies the color values	Red	Green	Blue
49	Color to Alpha varies the transparency level of an image's component color values	Red to alpha	Green to alpha	Blue to alpha
50	Color to Alpha, Inverted varies the transparency level of the inverse of an image's component color values	Inverted Red to alpha	Inverted Green to alpha	Inverted Blue to alpha
51	Texture Mixing crossfades between the current image and another graphic object texture	Selects Source Texture	Selects Source Effect Level	Crossfade Between Textures
52	**Image Scale and Rotate** Scales and rotates the media file texture applied to a 3-D object	Scales image	Selects Rotation Angle	Sets Rotation Speed
53	Film Roll scrolls the media file texture horizontally or vertically	Horizontal roll speed	Vertical roll speed	Scales Image
54	Pixelate divides the image into rectangles using the center pixel color of each "box" as it's color	Sets amount of Pixelation	Scales horizontally	Scales vertically
55	Faux LED divides the image into a grid of circles to mimic an LED wall	LED size	Spacing	Color peaking
56	Faux Tile divides the image into square tiles	Tile Size	Spacing	Color peaking
57	Fuzzifier creates a multi-image blurring effect	Horizontal distance	Vertical distance	Fuzz Decay
58	Drop Shadow creates a scalable drop shadow behind the graphic object	Horizontal shadow size	Vertical shadow size	Shadow opacity
59	Zoom Blur Zooms into a position on the image with a mult-image blurring effect	Horizontal position center	Vertical position center	Zoom in and out
60	Chroma Shift Shifts the red, blue, and green component colors	Horizontal shift	Vertical shift	Not Used
61	ShakeNBake Introduces a random vibration effect	Horizontal Shake	Vertical Shake	Scale
62	Slats, Vertical renders the image in offset vertical slats	Number of Slats	Vertical Displacement	Fade from Normal to Slats
63	Slats, Horizontal renders the image in offset horizontal slats	Number of Slats	Horizontal Displacement	Fade from Normal to Slats
80	Downward Vertical Streaks "pulls" the image down	Vertical Start Position	Streak Angle	Fade from Normal to Streak

Effect Mode		Adjustments		
DMX Value	**Name**/Description	**Modifier 1**	**Modifier 2**	**Modifier 3**
81	Gaussian Blur	Sample Distance	Number of Filter Passes	Scales the Effect
82	Sharpen enhances image detail	Sample Distance	Number of Filter Passes	Scales the Sharpen Effect
128	Mask Color applies color to mask parameter selection	Red	Green	Blue
129	Edge Fade Color applies color to Edge Fade Parameter selection	Red	Green	Blue
130	Mask Color and Edge Fade Color applies the same color to both the selected Mask and Image Edge Fade parameters	Red	Green	Blue
131	Background Color selects background color	Red	Green	Blue
132	Background Color Cycle sequences the background color	Red Speed	Green Speed	Blue Speed
133	Fading creates Edge Fade profiles	Selects Mode	Adjusts Profile	Selects Source
134	Collage Generator allows a fixture to display a portion of the output to create multi-fixture panorama displays.	Selects Array Type	Selects array cell to display	Adjusts Edge blending
135	Curved Surface, Vertical Convex Cylinder corrects shape projecting on curved surface	Adjusts Correction	Sets Vertical Center	Not Used
136	Curved Surface, Vertical Concave Cylinder corrects shape projecting on curved surface	Adjusts Correction	Sets Vertical Center	Not Used
137	Curved Surface, Vertical Inside Corner corrects shape projecting on curved surface	Adjusts Correction	Sets Vertical Center	Sets Horizontal Center
138	Curved Surface, Vertical Outside Corner corrects shape projecting on curved surface	Adjusts Correction	Sets Vertical Center	Sets Horizontal Center
139	Curved Surface, Outside Sphere corrects shape projecting on a sphere's outside surface	Adjusts Correction	Sets Vertical Center	Sets Horizontal Center
140	Curved Surface, Inside Sphere corrects shape projecting on a sphere's inside surface	Adjusts Correction	Sets Vertical Center	Sets Horizontal Center
141	Enhanced Collage. Provides higher resolution for large Collage arrays larger than 4 x 4.	Selects Array Type	Selects array cell to display	Adjusts Edge blending
142	Spherical Mapping, Outside maps output to a portion of a sphere's outside surface.	Sets Longitude Angle	Sets Latitude Angle	Sets Latitude Center
143	Spherical Mapping, Inside maps output to a portion of a sphere's inside surface.	Sets Longitude Angle	Sets Latitude Angle	Sets Latitude Center
144	Mattes apply provided mattes over image	Matte Effect	Matte Pattern	Texture Source
145	Collage Generator 360 adds right and left edge blending to enable 360 degree panoramas	Selects Array Type	Selects array cell to display	Adjusts Edge blending
255	Pan and Scale Zooms in and pans across a still image	Horizontal position	Vertical position	Zoom in and out

Global Control

The **Global Control** parameter allows access to different global control modes. How you set the Global control parameter determines the functionality of the **Global Control Modifier** parameter.

Setting this parameter to a DMX value of 255 brings up On-screen programming statistics. In this case, the **Global Control Modifier** parameter controls the text color.

Shutdown and Reset Options

When the Global Intensity parameter is set to 0, you can Shutdown Axon (DMX Value = 120-130) or Reset the internal Graphics Engine for either Axon or DL.2 media servers (DMX Value = 145-149).

Four-in-One Control Option

The **Four-in-One** control option maps the media file content of each of the graphics objects and the combined output to a four quadrant grid. This option helps you visualize what the graphics engine is doing.

When the Global Control parameter is set to a DMX value = 253, you can use the **Global Control Modifier** parameter to control the Four-in-One control option. You will be able to observe the Collage and Curved Surface support effects as well as up to 3 effects applied to each graphical object.

Setting a DMX value = 31, 32 or 33 lets you display up to three effects applied to a Graphic Object. These effects are accessed according to rendering hierarchy used by the graphics engine. The following table sets up an example of three graphic objects with **x**'s indicating applied effects.

Effect Hierarchy	Graphic Object 1	Graphic Object 2	Graphic Object 3
Visual Effect	x		x
Graphic Effect 1		x	x
Graphic Effect 2	x	x	x

Using this example, the following table illustrates the results for Four-in-One control values selected in the Global Control Modifier parameter:

DMX Value	4-in-1 Display	
31	Graphic Object 1 Texture + Visual Effect	Graphic Object 2 Texture + Effect 1
	Graphic Object 3 Texture + Visual Effect	Final Composite Image
32	Graphic Object 1 Texture + Visual Effect + Effect 2	Graphic Object 2 Texture + Effect 1 + Effect 2
	Graphic Object 3 Texture + Visual Effect + Effect 1	Final Composite Image
33	Graphic Object 1 Texture + Visual Effect + Effect 2	Graphic Object 2 Texture + Effect 1 + Effect 2
	Graphic Object 3 Texture + Visual Effect + Effect 1 + Effect 2	Final Composite Image

On-Screen Frame Statistics

When the Global Control parameter is set at a DMX Value of 255, the Global Control Modifier channel lets you choose the text color that will best display over your selected image:

DMX Value	Color
1	Gray
2	Red
3	Blue
4	Green

Masking Control

Mask Shape Select and Strobing

The **Mask Select** parameter lets you choose a mask to frame or overlay a composite image. You can choose to apply a mask to an image when you don't want an entire image to be seen or you want to transition from an image to black or a solid color without fading intensity.

Mask Shapes

The graphics engine currently provides 30 mask shapes including circular, rectangular, and oval masks that close from inside out or outside in. Checker Board, Radial Wipes, and Multi-panel options are also included with variations.

Default DMX Value = 0 Round "iris" mask closing from outside in.

DMX values 0-127 (0-50%) are reserved for static mask shapes. Values of 128-255 (51-100%) are reserved for strobing Mask shapes. Values not yet implemented default to 128.

Strobing Mask Shapes

A strobing version of each simple mask shape is defined in the 128-255 (51-100%) DMX value range. When a strobing mask is selected, the strobe rate is controlled by the **Mask Edge Fade** parameter from the slowest = 0 to the fastest = 255 (100%).

DMX value	Strobe DMX Value	Mask Shapes
0	128	Round "iris" mask closing from outside in
1	129	Round *iris* closing from inside out
2	130	Rectangle closing from outside in
3	131	Rectangle closing from inside out
4	132	Checkerboard, variation 1
5	133	Checkerboard, variation 2
6	134	Radial wipe, variation 1
7	135	Radial wipe, variation 2
8	136	Radial wipe, variation 3
9	137	Radial wipe, variation 4
10	138	Triangles, variation 1
11	139	Triangles, variation 2
12	140	Rectangular wrap
13	141	Tiles closing in
14	142	Horizontal doors, closing
15	143	Horizontal doors closing from opposing sides
16	144	Vertical doors closing from outside in
17	145	Vertical wipe closing from inside out
18	146	Rectangular tiles closing from inside out 1
19	147	Rectangular tiles closing from inside out 2
20	148	Vertical panels closing from outside in 1
21	149	Vertical panels closing from outside in 2
22	150	Vertical diamonds 1
23	151	Vertical diamonds 2
24	152	Horizontal diamonds 1
25	153	Horizontal diamonds 2
26	154	Pinwheel
27	155	Oval Iris closing from outside in
28	156	Oval Iris closing from inside out
29	157	Oscillating iris closing from outside in
30	158	Animated dynamic Iris

***Note:** A Global Effect Mode parameter option lets you define a Mask color, (see* **Global Effect Mode 1 and Effect Mode 2** *on page 86, and* **Mask Color** *on page 125).*

Mask Size

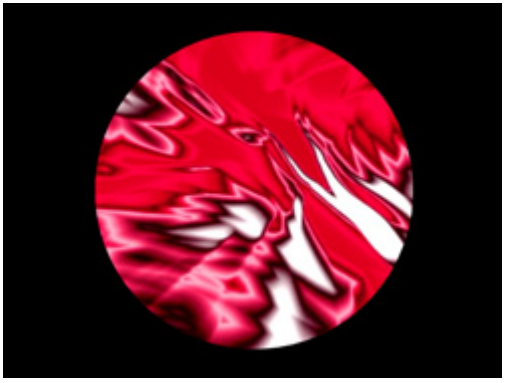
The Mask Size parameter defines mask size for all mask shapes.

Default DMX Value: 255 (100%) = no masking effect

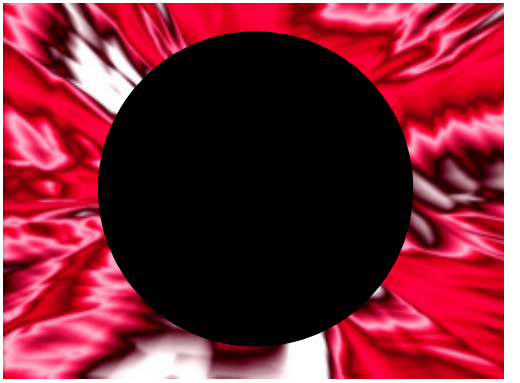
When this parameter is set at a value of 255 (100%), the mask is sized to leave the image 100% visible. When Mask Size is set at 0, the mask totally covers the composite image.

Tip: Crossfading the Mask Size parameter can create unique fades to and from video black.

Mask Select DMX value = 0
Mask Size DMX value = 255 (100%)



Mask Select value of 0
Mask Size DMX value = 128 (50%)



Mask Select DMX value = 1
Mask Size DMX value = 126 (50%)

Mask Edge Fade

The **Mask Edge Fade** parameter diffuses the edge of your chosen mask.

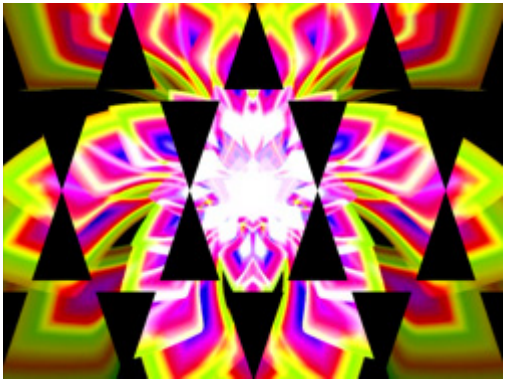
Default DMX Value: 0 = no edge fade applied to mask

Adjust the amount of edge fade from 1 = no edge fade to 255 = maximum edge fade.

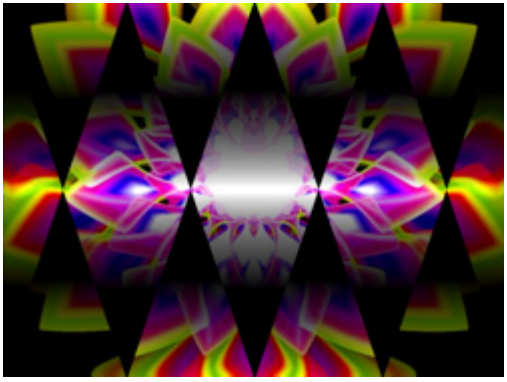
When a Mask Select parameter value of

Note: A Global Effect Mode parameter option lets you define a Mask Edge Fade color on page 125.

Original Image



Mask applied without Edge Fade



Mask with Edge Fade applied

Image Edge Fade

Four **Image Edge Fade** parameters let you control the Edge Fade for individual sides of your object (top, bottom, left and right). When projecting abutting images, adjusting the Edge Fade parameter lets you smooth the line between two images and also allows you to change an object's boundary.

Default DMX Value: 0 = all edges are sharp and hard.

Adjust each side separately for edge fade from 0 = no fade to 255 (100%) = opaque.

Original Content

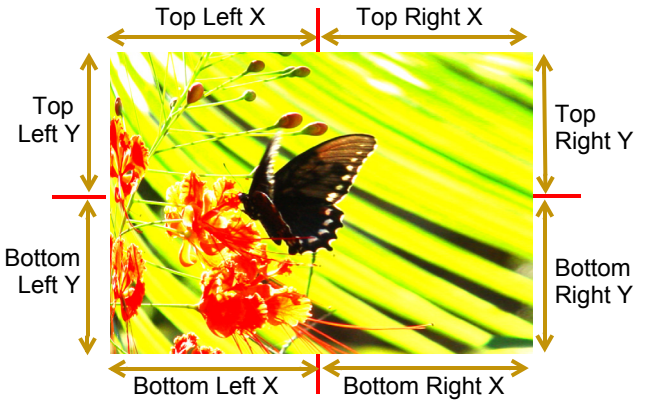
100% Top Edge Fade

100% Left Edge Fade

100% Top, Bottom, Left, Right Edge Fade

Keystone Correction Parameters

When you output an image from a projector at an angle, the image may appear skewed. Eight **Keystone** parameters adjust the image shape and compensate for this effect. You can control each of the four corners of the graphics output to reshape your image to a form that projects correctly.



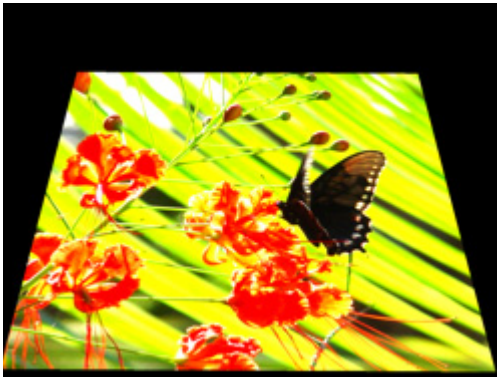
Original Content

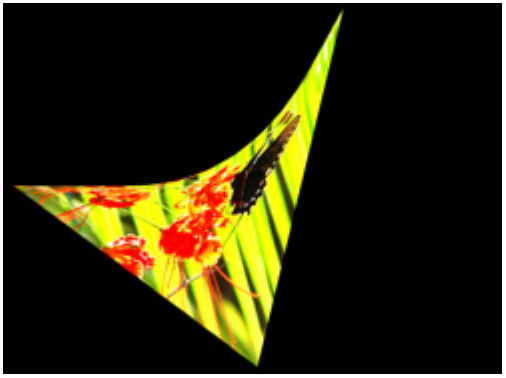
Default DMX Value: 0 = no keystone correction has been applied

Each corner has an x and a y value that adjust and correct scale of the projection from any corner toward the image center on that axis.

Setting all **Keystone X** and **Y** parameters DMX values to zero will place the four corners of the image at the four corners of the projector output. Adjusting keystone x values toward 255 (100%) moves the respective corner x positions horizontally toward the center of that image edge. Adjusting keystone y values toward 255 (100%) causes the respective corner y positions to be moved vertically toward the center of that edge of the image.

Tip: These parameters can also be used to create interesting skewing as a design effect.


Keystone Top Left X DMX value = 85
Keystone Top Left Y DMX value = 85
Keystone Top Right X DMX value = 85
Keystone Top Right Y DMX value = 85


Keystone Top Right Y DMX value = 170
All other Keystone parameter DMX values = 255

X Ratio

The X Ratio Parameter shapes the output to adjust for keystone effects created in certain output situations. This parameter adjusts the output by compressing or expanding the image horizontally.

Default DMX Value: 128 (50%) = no adjustment

DMX value settings below the midpoint of the range compress the image horizontally from maximum compression at a value of 0 to no compression at a value of 128. DMX value settings above the midpoint of the range expand the image horizontally from no expansion at a value of 128 to maximum expansion at a value of 255.

Original media file

X Ratio DMX value = 255 (100%)

Y Ratio

The **Y Ratio** parameter shapes the output to adjust for keystone effects created in certain output situations. This parameter adjusts the output by compressing or expanding the image vertically.

Default DMX Value: 128 (50%) = no adjustment

DMX value settings below the midpoint of the range compress the image vertically from maximum compression at a value of 0 to no compression at a value of 128.

DMX value settings above the midpoint of the range expands the image vertically from no expansion at a value of 128 to maximum expansion at a value of 255.

Y Ratio DMX value = 255 (100%)

Global Viewpoint Mode

The **Global Viewpoint Mode** parameter defines a 3-D space and the **Viewpoint Position** parameters modify your *viewing location* with the defined 3-D space. Each Viewpoint Mode uses three values to specify a viewpoint in space. This point in space is specified by the horizontal angle, vertical angle, and zoom.

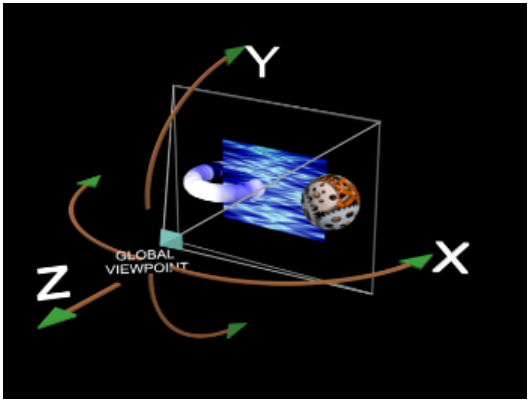
Within any 3-D space, you can choose the viewpoint target as:

- Center of 3-D space
- Center of Object 1
- Center of Object 2
- Center of Object 3

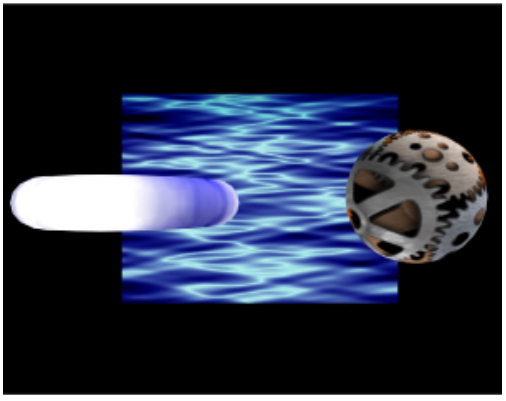
Default DMX Value: 0 = Perspective view, Spherical Coordinates with the focus at the center of the 3-D space.

Perspective View, Spherical Coordinates

This Viewpoint mode creates a 3-D space with a perspective view of a 3-D space. Viewpoints are located in terms of X, Y and Z positions located on a sphere surrounding the image.



Global Viewpoint set with X, Y, and Z positions all equal to zero.



Output displayed with global viewpoint shown at left.

Perspective View, Cartesian Coordinates

This Viewpoint mode parameter creates a 3-D space with a perspective view. Viewpoints are located in terms of rectangular X, Y and Z positions describing a location in this space.

Orthogonal View, Cartesian Coordinates

This Viewpoint mode creates a 3-D space without perspective. Viewpoint are located in terms of rectangular X, Y and Z positions describing a location in this space. In this case, the composite image is always flat.

Viewpoint Position X

The **Viewpoint Position X** parameter determines the x component of the viewpoint position to the target you have specified in the Viewpoint Mode parameter. The horizontal angle is the angle around the vertical (y) axis. Heading is another name for this angle.

Default DMX Value: 32768 = center

DMX values above center of the range move counterclockwise to the maximum horizontal angle at a value of 65535 (100%). DMX values below the center move clockwise to the minimum horizontal angle at a value of 0.

Viewpoint Position Y

The **Viewpoint Position Y** parameter sets the vertical angle above/below the horizontal plane. Pitch is another name for this component of the viewpoint position.

Default DMX Value: 32768 = center

DMX values above the center of the range move counterclockwise to the maximum vertical angle at a value of 65535 (100%). DMX values below the center move clockwise to the minimum vertical angle at a value of 0.

Viewpoint Position Z (Zoom)

The **Viewpoint Position Z (Zoom)** parameter is the distance from the view target. Zooming toward the target, you can move through it and view it from the back side creating an mirror image view of the composite object.

Default DMX Value: 30260 = center (This default value is slightly less than midway through the range to maintain some depth to the view of a composite image.)

DMX values above center move toward the maximum distance from origin in back of view target (a DMX value of 65535). DMX values below center move toward the maximum distance from origin in front of view target at a value of zero.

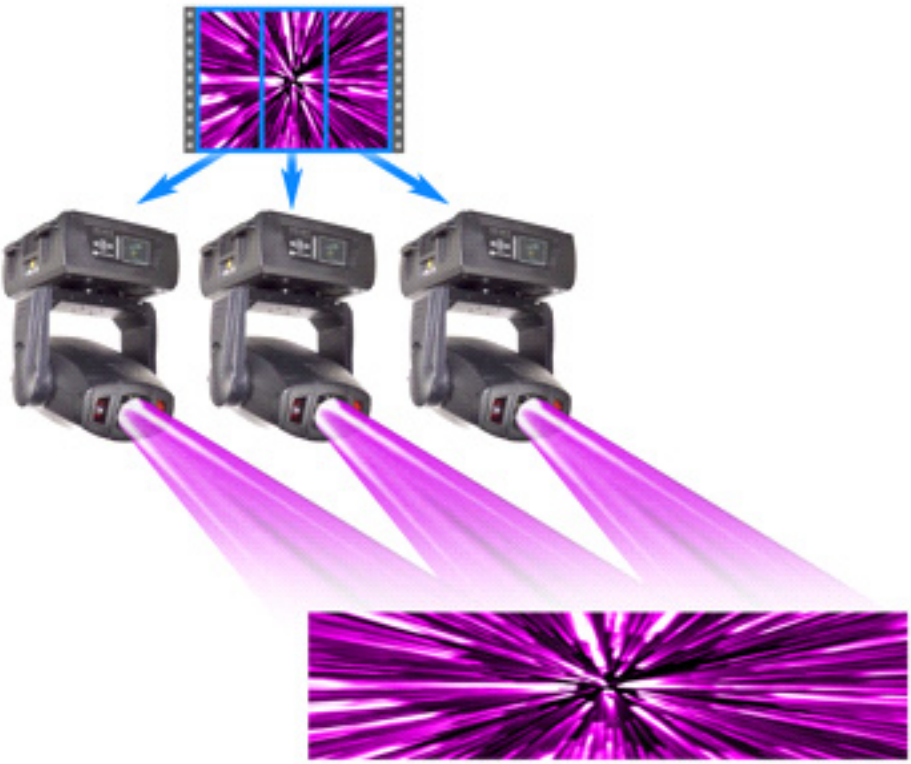
Chapter II:

Global Functions: Collage Generator™ Effect

Using the Collage™ Generator effect option lets you configure multiple media server outputs to display a single image in arrays up to 8 x 8.

Collage Generator™ technology allows you to create virtually seamless panoramic media projections controlled from your DMX console. You can display either stock or custom content.

You can create a Collage™ effect using DL.2 fixtures or Axon media servers outputting to DL.1 fixtures or other digital projectors. When using third party projectors, you will need to position output manually.



Panorama Collage™ Configurations

You can create Collage arrays in any configuration up to 8 x 8 cells. The native aspect ratio of one DL.2 or Axon media server output is 4:3. Some of the arrays configured in conjunction with the collage generator will output a different overall aspect ratio.

Computing Collage Specifications

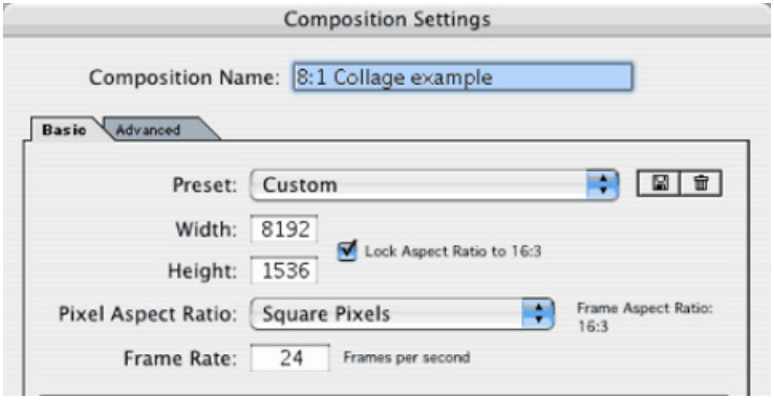
The formula to determine the correct size for your collage footage is fairly simple. The native aspect of HES media servers is 1024 x 768. You can use these numbers to determine the correct size and aspect ratio for all collage configurations. The total pixel count once adjustments are made should be close to but not exceed 800,000 pixels total.

Example

To determine and create 8 x 2 collage footage:

1. Open a new composition in a video-editing program such as Adobe After Effects (many other programs will work).
2. Multiply 8 x 1024 = 8192 (horizontal/width) enter 8192 into the Width column of you composition setting window
3. Multiply 2 x 768 = 1536 (vertical/height) enter 1536 into the Height column.

   The correct aspect ratio will appear next to these numbers, lock the aspect ratio button. In this case it is 16:3.

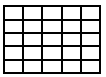
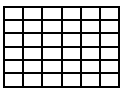
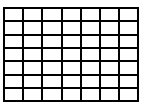
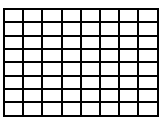


4. Adjust the Height with the Aspect ratio locked then multiply the Height and Width and make adjustments to the Width until your pixel count is close to 800,000 total.
5. Once you have achieved a pixel count close to 800,000 make sure it is a multiple of 16 (for correct MPEG encoding) by simply dividing your width by 16 and making adjustments.
6. The image shows the resulting configuration determined for a 8 x 2 array.
7. Add your HD footage, size, scale and or crop accordingly, light optimize and out-put your master file for encoding.

The following tables shows configuration specifications for selected Collage options.

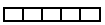
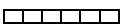
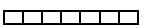
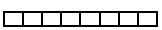
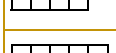
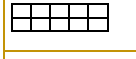
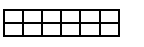
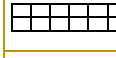
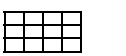
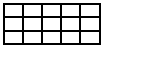
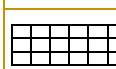
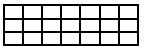
Array describes the number of outputs positioned horizontally by the number of outputs positioned vertically, each displaying their portion of the content. The second set of numbers is the **aspect ratio** for the overall panorama configuration. **Image Resolution** is represented as width and height in pixels. The number of **DL2 units** required is also noted.

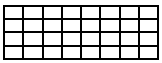
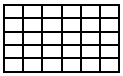
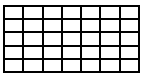
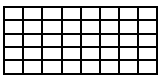
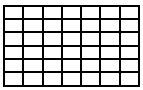
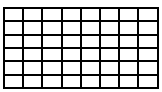
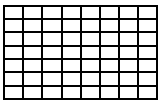
Sample Central Panorama Collage Specifications

Array Configuration	Array (W x H)	Maximum Recommended Image Resolution (W x H)	DL.2 Units
	2 x 2	1024 W x 768 H	4
	3 x 3	1024 W x 768 H	9
	4 x 4	1024 W x 768 H	16
	5 x 5	1024 W x 768 H	25
	6 x 6	1024 W x 768 H	36
	7 x 7	1024 W x 768 H	49
	8 x 8	1024 W x 768 H	64

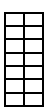
Note: All Central Panorama Collages will have the 4:3 aspect ratio.

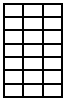
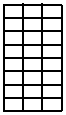
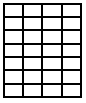
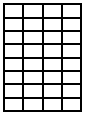
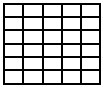
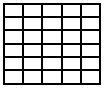
Horizontal Panorama Collage Specifications

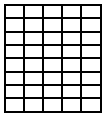
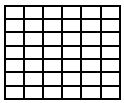
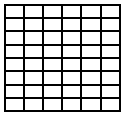
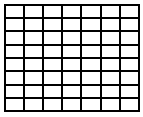
Array Configuration	Array (W x H)	Maximum Recommended Image Resolution (W x H)	DL.2 Units
	2 x 1	1376 W x 569 H	2
	3 x 1	1648 W x 471 H	3
	4 x 1	1904 W x 416 H	4
	5 x 1	2048 W x 361 H	5
	6 x 1	2288 W x 339 H	6
	7 x 1	2464 W x 315 H	7
	8 x 1	2624 W x 294 H	8
	3 x 2	1248 W x 624 H	6
	4 x 2	1444 W x 544 H	8
	5 x 2	1584 W x 489 H	10
	6 x 2	1728 W x 448 H	12
	7 x 2	1856 W x 415 H	14
	8 x 2	1984 W x 389 H	16
	4 x 3	1184 W x 646 H	15
	5 x 3	1328 W x 586 H	15
	6 x 3	1456 W x 539 H	18
	7 x 3	1568 W x 489 H	21
	8 x 3	1652 W x 463 H	24
	5 x 4	1152 W x 661 H	20
	6 x 4	1280 W x 616 H	24
	7 x 4	1376 W x 571 H	28

Array Configuration	Array (W x H)	Maximum Recommended Image Resolution (W x H)	DL.2 Units
	8 x 4	1456 W x 531 H	32
	6 x 5	1152 W x 683 H	30
	7 x 5	1232 W x 629 H	35
	8 x 5	1312 W x 589 H	40
	7 x 6	1136 W x 689 H	42
	8 x 6	1216 W x 648 H	48
	8 x 7	1120 W x 691 H	56

Selected Vertical Panoramas Collage Specifications

Array Configuration	Array (W x H)	Maximum Recommended Image Resolution (W x H)	DL.2 Units
	1 x 2	768 W x 1008 H	2
	1 x 3	640 W x 1200 H	3
	1 x 4	560 W x 1365 H	4
	1 x 5	512 W x 1536 H	5
	1 x 6	474 W x 1689 H	6
	1 x 7	432 W x 1782 H	7
	1 x 8	400 W x 1875 H	8
	2 x 3	864 W x 894 H	6
	2 x 4	752 W x 1011 H	8
	2 x 5	688 W x 1139 H	10
	2 x 6	624 W x 1226 H	12
	2 x 7	576 W x 1311 H	14
	2 x 8	544 W x 1407 H	16

Array Configuration	Array (W x H)	Maximum Recommended Image Resolution (W x H)	DL.2 Units
	3 x 4	912 W x 847 H	12
	3 x 5	816 W x 933 H	15
	3 x 6	752 W x 1021 H	18
	3 x 7	704 W x 1106 H	21
	3 x 8	656 W x 1171 H	24
	4 x 5	944 W x 824 H	20
	4 x 6	864 W x 895 H	24
	4 x 7	800 W x 960 H	28
	4 x 8	752 W x 1025 H	32
	5 x 6	960 W x 805 H	30
	5 x 7	892 W x 866 H	35

Array Configuration	Array (W x H)	Maximum Recommended Image Resolution (W x H)	DL.2 Units
	5 x 8	832 W x 866 H	40
	6 x 7	976 W x 795 H	42
	6 x 8	912 W x 844 H	48
	7 x 8	976 W x 976 H	56

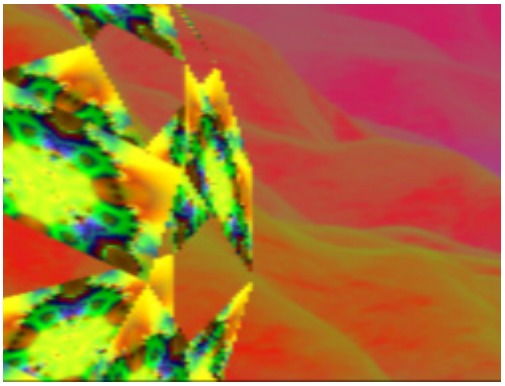
Note: ***You can find othe configurations and more information on sizing and compressing media to use with the Collage Generator at the High End Systems website (www.highend.com).***

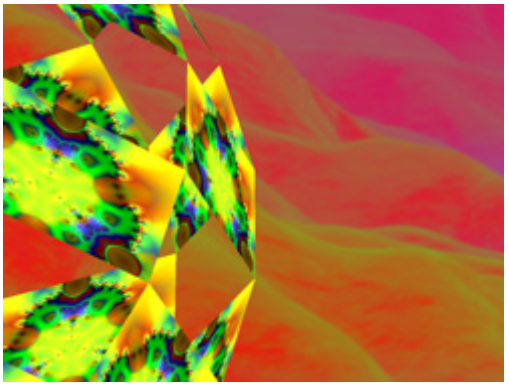
Configuring the Collage Generator

There are two Collage Generator options in either Global Effect Mode parameter. The original **Collage Generator** option (selected with a Global Effect DMX value = 134), should only be used with legacy shows. The Enhanced Collage Generator provides cleaner images and better edge blending.

The **Enhanced Collage Generator** option eliminates heavy aliasing of objects and fuzzy images on larger grids. You can select the Enhanced Collage Generator option in the Global Effect Mode with a DMX value = 141.

The images below illustrate the difference in the projected image of a cell from an 8 x 5 grid. The image on the left shows the projector using the original Collage Generator option and the image on the right shows the improved resolution obtained with the Enhanced Collage Generator option.





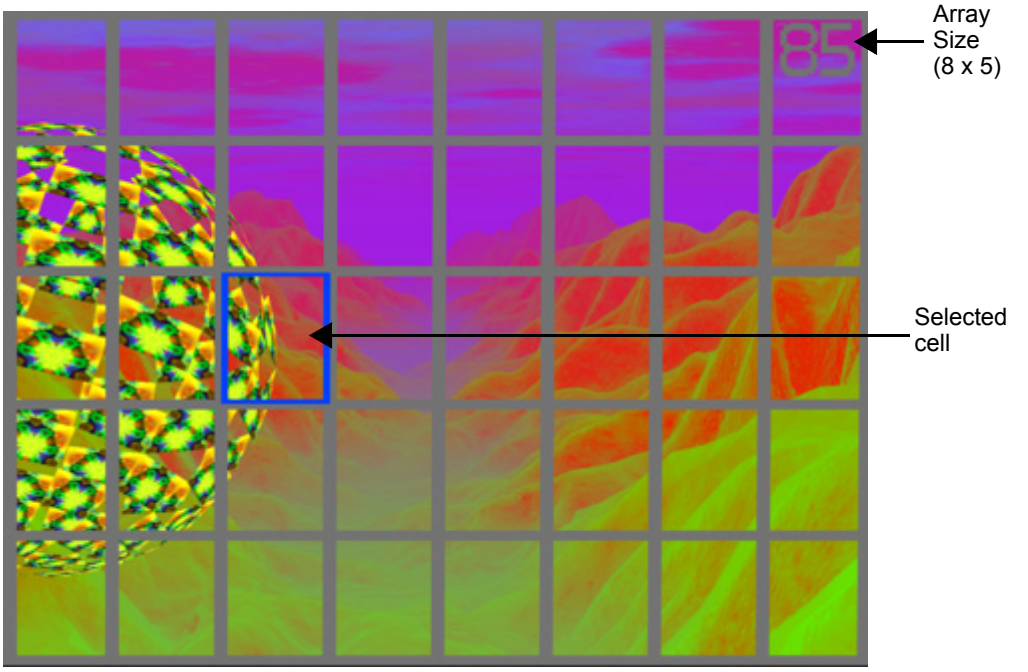
Adjusting the Collage Array

The three **Global Effects Mode Modifier** parameters operate as follows:

The **Modifier 1** parameter selects which type of collage array to use from DMX Values 1-63. The selected size displays in the upper right corner of the grid pattern. A DMX value of 0 = No collage. DMX Values of 64-255 are reserved and default to No collage.

DMX Value	Array (W x H)	DMX Value	Array (W x H)	DMX Value	Array (W x H)	DMX Value	Array (W x H)	DMX Value	Array (W x H)	DMX Value	Array (W x H)
0	None	11	4 x 2	22	5 x 4	33	6 x 5	44	7 x 5	54	8 x 4
1	2 x 1	12	2 x 4	23	4 x 5	34	5 x 6	45	5 x 7	55	4 x 8
2	1 x 2	13	4 x 3	24	5 x 5	35	6 x 6	46	7 x 6	56	8 x 5
3	2 x 2	14	3 x 4	25	6 x 1	36	7 x 1	47	6 x 7	57	5 x 8
4	3 x 1	15	4 x 4	26	1 x 6	37	1 x 7	48	7 x 7	58	8 x 6
5	1 x 3	16	5 x 1	27	6 x 2	38	7 x 2	49	8 x 1	59	6 x 8
6	3 x 2	17	1 x 5	28	2 x 6	39	2 x 7	50	1 x 8	60	8 x 7
7	2 x 3	18	5 x 2	29	6 x 3	40	7 x 3	51	8 x 2	61	7 x 8
8	3 x 3	19	2 x 5	30	3 x 6	41	3 x 7	52	2 x 8	62	8 x 8
9	4 x 1	20	5 x 3	31	6 x 4	42	7 x 4	53	8 x 3		
10	1 x 4	21	3 x 5	32	4 x 6	43	4 x 7	53	3 x 8		

The **Modifier 2** channel selects which cell of the grid a particular DL2 will display. DMX values 0 up to 63 are used to step through grid pattern you selected with the Modifier 1 channel. As you dial through Modifier 2 you will see each cell in the grid highlight in a as it is selected. DMX values of 64-255 default to the upper left corner of the grid.



The **Modifier 3** channel lets you manually or automatically control the blended edges of the adjacent projections. You can also display grid overlays that show your Modifier 1 and Modifier 2 channel selections.

	Action
0-127	Adjusts blending
128-160	Displays rectangular area with no blending
161-191	Displays rectangular area with no blending covering full projector output
192-199	Displays default alignment pattern in rectangular area without blend area
200-207	Displays default alignment pattern with blending
208-215	Displays default alignment pattern and blend area with no blending
216-255	Displays collage selection grid over selected image/movie.

Collage Setup Example

Here's a typical scenario for setting up a 2 x 2 central panorama collage effect.

NOTE: ***If you are going to be mapping your collage to a sphere, you will need to roughly adjust the output before you set up the collage. See*** *Spherical Mapping Setup Guide* ***on page 112.***

Setup the collage effect:

1. Select the same content on four media servers.

   NOTE: ***Any parameter adjustment to a graphic object must be set on ALL graphic objects that are a part of the collage. For example, if you are configuring Graphic Object 1 on four media servers to project as a collage and want to apply a color effect, that effect must be manipulated on Graphic Object 1 of all four media servers.***

2. On all the media servers you are configuring, set a **Global Effect Mode** channel to a DMX value of 141 to select the Enhanced Collage Generator option.

   TIP: ***For the most reliable performance, use the same Global Effect Mode parameter on all the Graphic objects to set up the collage effect. This also leaves the other Global Effect Mode parameter available for adding a second effect like spherical mapping to the composite image.***

3. On all the media servers you are configuring, set **Modifier 1** DMX value = 1 to activate the array options. *The selection grid will not appear until the first modifier is set above 0*
4. On all the media servers you are configuring, set **Modifier 3** DMX value = 255 (100%) to display the selection grid.
5. On all the media servers you are configuring, increase Modifier 1 to a value between 1 and 63 to select a collage array configuration.
6. On each individual server, set **Modifier 2** DMX value between 1-63 to select the grid cell that media server will project
7. Use **Position**, **Keystone** and **Ratio** parameters to align the projections of the individual media servers in such a way that there is some overlap between the separate portions of the image. This overlap is needed for blending adjustment.
8. Set **Modifier 3** to a DMX value between 192 and 203 to define a hard edge for alignment. Readjust Position, Keystone and Ratio parameters to bring collage elements into good alignment.
9. Increase the **Modifier 3** DMX value = 203-207 to blend the overlap between the outputs. Readjust Position, Keystone and Ratio parameters to bring collage elements to fine tune alignment.
10. On all the media servers you are configuring, set the **Global Effect Mode Modifier 3** parameter to a DMX value to the default range of 0-127 (with edge blending) or between 128-159 (without edge blending) to put the media server output into their cropped collaged state. The choice between the two values will depend on your preference for aligning the images.

Execute the panorama collage:

1. Create a setup cue that identifies the content media file and folder, sets the Play Mode parameter to *Pause and Rewind to In Frame* (DMX = 5) and the Opacity to 0 for the same graphic object on all units you are configuring for the panorama.
2. For this example, follow with a cue that sets the Play Mode parameter of *Play Loop Forward* (DMX = 0) and brings up the Opacity to 100% for the same graphic object on all units you are configuring for the panorama.

Mapping a Collage to a Spherical Surface

The Spherical Mapping effect takes the normal rectangular output and wraps it on selected portion of a sphere. This is the same as wrapping a flat map on to a globe. The horizontal position of a point is its longitude. The vertical position of a point is its latitude.

Adjusting the Spherical Mapping effect requires a total of nine **Modifier** parameters. Selecting Spherical Mapping along with the Collage Generator effect uses the available Global Effects. In addition to the three Modifier Parameters associated with the Spherical Mapping selection, six Modifier parameters are accessed by using two Graphic **Effect Mode** parameters. Any available Effect from any Graphic Object can be used. The two Effects parameters do not have to be from the same Graphic Object. One of these Effect enables the Modifier parameters to control the vertical position of the projector (actually the graphics viewpoint), the vertical position of the sphere and a vertical size control. The other Effect provides Effect Modifiers to control of the amount of vertical bend in horizontal lines, the vertical center of the added bend, and a horizontal size control.

Spherical Mapping Setup Guide

Before You Begin

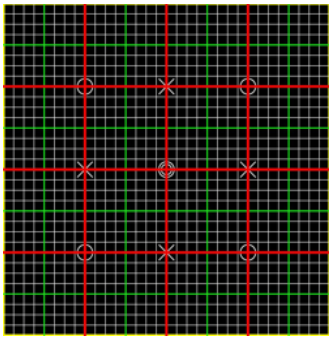
Successful spherical mapping requires careful positioning of the DL.2 units or Axon-controlled projectors you are using. Units should be mounted at equal angles from each other and the same distance from the sphere. Mounting units at the same height will minimize the tilt angle adjustments you will need to make.

Mapping Two Outputs to a Sphere

The following example describing mapping two outputs on a sphere, with each covering half of the surface. For best results, make each adjustment to both outputs as you follow the example. After you've completed the following steps, you can more easily transfer the DMX values to the outputs for other cells of the collage.

Select a Global Effect and two Graphic Effects to control Spherical Mapping:

1. Set **Global Effect 1** ***or*** **Global Effect 2** channel to a DMX value = 142 to select the Spherical Mapping option. Set the three associated Global Effect Modifiers to their default values (Modifier 1=0, Modifier 2=0, Modifier 3 = 128).
2. Select the Spherical Mapping Control 1 option (DMX = 253) in any available Graphic **Effect Mode** channel. Set the three associated Effect Modifiers to their default DMX values (Modifier 1 = 128, Modifier 2 = 128, Modifier 3 = 64).
3. Select the Spherical Mapping Control 2 option (DMX value = 254) on any available Graphic **Effect Mode** channel. Set all associated Effect Modifiers to their default DMX values. (Modifier 1 = 0, Modifier 2 = 128, Modifier 3 = 64)
4. In the **Global Control** channel, select the on-screen statistics for the spherical mapping option (DMX value = 252). Use the **Global Control Modifier** to select text color for easier viewing.
5. Select the 4 x 3 (Flat Plane) option in the **3-D Object** channel (DMX = 1).
6. Select the HES Set Up and Test option in the **Media Folder** channel (DMX = 39), and Test Grid.jpg in the **File Folder** (DMX = 9).



At this point, you should be viewing the two projected grids with statistics displayed. If you do not see an output, re-check that all Modifier parameters are set to their default values.

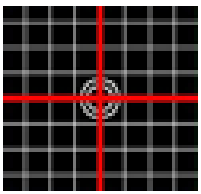
TIP: Before you begin other adjustment, physically view the grid from along the centerline of the fixture. The centerline of the grid should align with the center of the sphere. You can easily adjust any variation using the Pan channel. The object is to align the vertical lines of the guide with the vertical axis of the sphere.

Adjust output positioning on the sphere:

7. Use **Global Effect Modifier 2** adjust the latitude angle. You can view the Latitude top and Latitude bottom statistics to see the degrees of spread + or – from the "equator".
8. Use **Global Effect Modifiers 3** to move the output up or down to the part of the sphere you want to cover. The Latitude top and Latitude bottom statistics show you the center of adjustment in degrees + or – from the "equator".
9. Adjust the **Global Effect Modifier 1** to set the longitude angle.

Make viewpoint adjustments:

10. On the **Graphic Effect Mode** channel set to Spherical Control 1 (DMX = 253), use **Modifier 1** to move the center of the grid to the center of the output marked by the double circles around the crossed lines. This adjusts vertical offset to accommodate the projector's position. The default value assumes a viewpoint straight on to the "equator". **Modifier 2** adjusts the sphere's offset to compensate for projector head tilt.



NOTE: After completing a rough adjustment, you will use these two modifier channels for the fine tuning.

11. Use **Modifier 3** to adjust the vertical size of the output, stretching and compressing it to adjust for the size of the sphere, keeping the vertical size of the grid filling the output without clipping the image.

Correct for the flat to round surface distortions

12. On the **Graphic Effect Mode** channel set to Spherical Control 2 (DMX = 254), use the associated **Modifier 3** to compress the grid edges adjusting the bend in horizontal grid lines. This adjustment should not be used to fill the projector output horizontally. Instead, it should be used in conjunction with the Spherical Mapping Global Effect Modifier 1 to control the longitude angle of the projected image. Global Effect Modifier 1 should be maintained close to the theoretical longitude angle.
13. Use **Modifier 1** and **Modifier 2** to adjust the amount of bend, up or down, in the horizontal lines of the grid. **Modifier 1** controls amount of correction. **Modifier 2** controls where the center of correction occurs.
14. If the spherical mapping effect is being used in conjunction with the Collage Generator effect, select the Enhanced Collage Generator option (DMX = 141) in the other **Global Effect** channel now. Set the appropriate grid size and grid elements selected with the internal collage alignment grid enabled. Go back through steps 1 through 11. Remember that pan and tilt adjustments are also available when using the DL.2 fixture.

Now you have a rough adjustment of the spherical mapping effect. From this point, finely adjust all the parameters until you bring the output to the desired shape.

When fine tuning Spherical Mapping adjustments, remember the following:

- The Graphic Object effect 253 Modifiers 1 and 2 have a major influence on the shape of the vertical lines.
- The Spherical Mapping Global Effect modifiers can be used to provide fine control of the shape of the vertical lines, but should be within several degrees of the expected latitude and longitude values.
- The Graphic Object effect 253 Modifiers 1 and 2 are used to finely adjust the vertical bend in horizontal lines.

Spherical Mapping Tips

- If the fixtures are arranged symmetrically around the sphere, the adjustment made to the various control Modifiers of Global and Graphic Spherical Mapping effects with be the same or nearly the same when the fine tuning is complete. You can save time by selecting the Modifier on all the fixtures you are using for the collage and making each adjustment on all the fixtures together.
- Projector Pan, Tilt, and Zoom also affect alignment.
- Don’t make small changes until the alignment is roughed in.
- When alignment doesn’t seem to be working, record and store you current settings, then go back to the default values and begin again.
- The longitude angle is the angle between fixtures from the vertical axis of the sphere and should be defined in your lighting plot. The plot should also give you a good idea of the latitude angle. The final values and those theoretical values should be close.

Creating Custom Content for the Collage Generator Effect

There are two main steps to process HD footage into Axon and DL2 compliant media for use with the collage generator.

First, acquire or commission High-resolution media footage or stills. In most cases, scaling and cropping of the media is a simple process. However, certain types of media such as footage of people or round objects like planets may require more sophisticated cropping and scaling to optimize display in certain aspect ratios.

Then**,** save your media at Photo jpeg 95% or a non compressed format (these can be very large files) to use as a master file. Or, if you are intermediate video editor yourself, there are many Video editing packages that will allow you to size and optimize the master for your application.

Once the master file/s are created, you will need high-definition encoder software. HES suggest Expert-HD for PC, www.pixeltools.com.

For more information on creating DL.2 content, see *Custom User Content* on page 247 or go to **www.highend.com/support/digital_lighting**.

Collages Using Live S-Video Input

Axon and DL.2 media servers can create collage arrays using S-Video input. All the media servers used to project a collage need to be receiving the same source input signal to use video as a Collage feed.

For example, using DL-2 Camera outputting across a 2 x 2 20-K lumen Central Panorama Collage, all four DL-2 are assigned an output from the D-Tek switcher to each S-Video input and a fifth DL-2 is used as the source

Chapter 12:

Effect Mode Options Descriptions

Effects can be applied to the Media File content (texture) mapped onto a 3-D object. Multiple Color and Geometric options are available in Effect Mode parameters for both individual Graphic object and Global control.

Most of the effect options you will find described in this chapter are available for **Effects 1** and **Effect 2** parameters at both the graphic control level for each Graphic Object as well as the Global control level for the composite image. The following pages describe all the Effect Mode options available along with a description of how each Modifier parameter functions with that mode selected.

Check boxes in the upper right hand corner indicate whether this mode is available as a Graphic Object Effect, a Global Effect or both.

☑ Object Effect ☑ Global Effect

Because the options for **Effect 1 Mode** and **Effect 2 Mode** are identical, you can apply up to two options at the graphic level and another two options at the global level. This lets you choose, for example, whether to apply a color effect option to an individual object or to the composite image at the global level.

After you select a mode using either a Graphic Object Effect Mode or a Global Effect Mode parameter, you can use the three associated Modifier parameters to adjust the effect. The behavior of the Modifier parameters depends upon the selected effect.

- For a general information on Graphics Control features, see *Graphics Engine Overview* on page 33.
- For a table of graphic level Effects parameter options, see *Effect 1 and Effect 2* on page 76.
- For a table of global level Effects parameter options, see *Global Effect Mode 1 and Effect Mode 2* on page 86.

NOTE: Both Object and Global Effect parameters include options for swapping colors to provide quick color conversions. Use the following DMX Values in any of the Effect parameters to make these color conversions.

DMX Value	Color Component Conversion Effect		
7	**Red → Green**	**Green → Blue**	**Blue → Red**
8	**Red → Blue**	**Green → Red**	**Blue → Green**
17	**Red → Cyan**	**Green → Magenta**	**Blue → Yellow**
18	**Red → Magenta**	**Green → Yellow**	**Blue → Cyan**
19	**Red → Yellow**	**Green → Cyan**	**Blue → Magenta**
41	**Red → Blue**	**Green → Green**	**Blue → Red**

DMX Value	Color Component Conversion Effect		
42	Red → Red	Green → Blue	Blue → Green
43	Red → Green	Green → Red	Blue → Blue

Effect Mode Color Options

All or Nothing

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 15

This option reduces all color values to full saturation or no color based on comparison to a set threshold. This effect creates an image with fully saturated color.

Modifier 1: Compares the red component of a pixel to the threshold value and converts it to full color if it is greater than the threshold and to black if it is below the threshold.

Modifier 2: Compares the green component of a pixel to the threshold value and converts it to full color if it is greater than the threshold and to black if it is below the threshold.

Modifier 3: Compares the blue component of a pixel to the threshold value and converts it to full color if it is greater than the threshold and to black if it is below the threshold.

Background Color

☐ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 131

There is a background behind every composite image. You cannot rotate, scale or position the background and it is visible from every viewpoint and position. This option allows you to apply color to the background.

Modifier 1: Defines the red color component from DMX values of 0 = no red to 255 (100%) = maximum red saturation.

Modifier 2: Defines the green color component from DMX values of 0 = no green to 255 (100%) = maximum green saturation.

Modifier 3: Defines the blue color component from DMX values of 0 = no blue to 255 (100%) = maximum blue saturation.

Background Color Cycle

☐ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 132

There is a background behind every composite image. You cannot rotate, scale or position the background and it is visible from every viewpoint and position. This option allows you to cycle a color sequence on the background controlling the transition speed.

Modifier 1: Defines the red color component speed. A DMX value of 128 (50%) = default cycle speed. DMX Values above the midpoint increase cycle speed in a forward direction to 255 (100%) = fastest change speed. DMX values below the midpoint increase cycle speed in a backward direction to 0 = fastest change speed.

Modifier 3: Defines the blue color component speed in the same way as Modifier 1.

Chromakey

☑ Object Effect ☑ Global Effect

A chromakey removes a color (or small color range) from one graphic image to reveal another "behind" it. The removed color becomes transparent. Modifier parameters define the color you want to select as the chromakey in terms of Red, Green and Blue values

Chromakey Coarse

Effect Mode parameter DMX value = 28

The Chromakey Coarse parameter selects a color range ±40% either side of the defined value.

Chromakey Fine

Effect Mode parameter DMX value = 26

The Chromakey Fine parameter selects a color range ±15% either side of the defined value.

Chromakey Medium

Effect Mode parameter DMX value = 27

The Chromakey Medium parameter selects a color range ±25% either side of the defined value.

Modifier Parameters

Modifier 1: Defines the red color component from DMX values of 0 = no red to 255 (100%) = maximum red saturation.

Modifier 2: Defines the green color component from DMX values of 0 = no green to 255 (100%) = maximum green saturation.

Modifier 3: Defines the blue color component from DMX values of 0 = no blue to 255 (100%) = maximum blue saturation.

Chromakey , Inverse

☑ Object Effect ☑ Global Effect

A chromakey removes a color (or small color range) from one graphic image to reveal another "behind" it. The removed color becomes transparent. The modifier parameters define the color you want to select as the chromakey in terms of Red, Green and Blue values. The Inverse Chromakey Coarse parameter selects a color range either side of the defined value and then sets every other color as chromakeyed.

Chromakey Coarse, Inverse

Effect Mode parameter DMX value = 31

The Inverse Chromakey Coarse parameter selects a color range ±40% either side of the defined value and then sets every other color as chromakeyed.

Chromakey Fine, Inverse

Effect Mode parameter DMX value = 29

The Inverse Chromakey Fine parameter selects a color range ±15% either side of the defined value and then sets every other color as a chromakey.

Chromakey Medium, Inverse

Effect Mode parameter DMX value = 30

The Inverse Chromakey Medium parameter selects a color range ±25% either side of the defined value and then sets every other color as chromakeyed.

Modifier Parameters

Modifier 1: Defines the red color component from 0 = no red to 255 (100%) = maximum red saturation.

Modifier 2: Defines the green color component from 0 = no green to 255 (100%) = maximum green saturation.

Modifier 3: Defines the blue color component from 0 = no blue to 255 (100%) = maximum blue saturation.

CMY

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 1

This parameter simulates CMY color by inverting RGB color components. Use this parameter when you want to color mix with a CMY color model instead of RGB color model.

Modifier 1: Increases cyan color component from 0 = no adjustment to 255 (100%) = maximum cyan saturation.

Modifier 2: Increases magenta color component from 0 = no adjustment to 255 (100%) = maximum magenta saturation.

Modifier 3: Increases yellow color component from 0 = no adjustment to 255 (100%) = maximum yellow saturation.

CMY Add All Pixels

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 2

This effect increases color values across all pixels including black pixels.

Modifier 1: Increases cyan color component from 0 = no adjustment to 255 (100%) = maximum cyan saturation.

Modifier 2: Increases magenta color component from 0 = no adjustment to 255 (100%) = maximum magenta saturation.

Modifier 3: Increases yellow color component from 0 = no adjustment to 255 (100%) = maximum yellow saturation.

CMY Add Non-black Pixels

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 3

This effect increases color values across all pixels except black pixels.

Modifier 1: Increases Cyan color component from 0 = no adjustment to 255 (100%) = maximum red saturation.

Modifier 2: Increases Magenta color component from 0 = no adjustment to 255 (100%) = maximum red saturation.

Modifier 3: Increases Yellow color component from 0 = no adjustment to 255 (100%) = maximum red saturation.

Color Cycle

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 14

The image's color components cycle through RGB, black, and white. When no Red Green or Blue is added, image fades from full white, to normal image, to black. When RGB/CMY is added the image fades from the RGB value, to the image with color added.

Modifier 1: Increases red color component from 0 = no adjustment to 255 (100%) = maximum red saturation.

Modifier 2: Increases green color component from 0 = no adjustment to 255 (100%) = maximum green saturation.

Modifier 3: Increases blue color component from 0 = no adjustment to 255 (100%) = maximum blue saturation.

Color DeConverge

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 39

This effect option separates the different color components of an image and offsets them from the original image position.

Modifier 1: Moves the image's red component up from 0= no adjustment to 255 (100%) = maximum distance from original position.

Modifier 2: Moves the image's green component down and right from 0= no adjustment to 255 (100%) = maximum adjustment.

Modifier 3: Moves the image's blue component down and left from 0 = no adjustment to 255 (100%) = maximum blue saturation.

Colorize Gray Scale

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 44

This option maps a selected pixel intensity to a selected color scheme. A variety of color schemes simulate effects like thermography. This is especially effective effect when applied to input from the internal camera.

Modifier 1: Selects from color schemes along a range of values from 0 – 255.

Modifier 2: Sets the zero point of the color intensity level from 0 = no intensity to 255 (100%) = maximum intensity.

Modifier 3: Fades from original color scheme to new color scheme using selected intensity.

Color to Alpha

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 49

This parameter varies the transparency level of an image's component color values.

Modifier 1: Increases the red component opacity or intensity from 0 = no adjustment to 255 (100%) = full red opacity (intensity).

Modifier 2: Increases the green component opacity or intensity from 0 = no adjustment to 255 (100%) = full green opacity (intensity).

Modifier 3: Increases the blue component opacity or intensity from 0 = no adjustment to 255 (100%) = full blue opacity (intensity).

Color to Alpha, Inverted

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 50

This parameter varies the transparency level of the inverse of an image's component color values.

Modifier 1: Increases the inverse red component opacity or intensity from 0 = no adjustment to 255 (100%) = full green and blue opacity (intensity).

Modifier 2: Increases the green component opacity or intensity from 0 = no adjustment to 255 (100%) = full red and blue opacity (intensity).

Modifier 3: Increases the blue component opacity or intensity from 0 = no adjustment to 255 (100%) = full red and green opacity (intensity).

DotP and Resample

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 13

This option applies an algorithm that pixelates, and solarizes the image. It also makes the surface of some 3D objects appear reflective.

Modifiers 1, Modifier 2 and Modifier 3 parameters work together to adjust the algorithm.

Edge Fade Color

☐ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 129

This option applies color to a selected **Edge Fade** parameter, (see *Image Edge Fade* on page 95)

Modifier 1: Increases red color component from 0 = no adjustment to 255 (100%) = maximum red saturation.

Modifier 2: Increases blue color component from 0 = no adjustment to 255 (100%) = maximum blue saturation.

Modifier 3: Increases green color component from 0 = no adjustment to 255 (100%) = maximum green saturation.

Glow

☑ Object Effect ☐ Global Effect

Effect Mode parameter DMX value = 73

Glow colorizes and creates a glow on the 3-D object separate from the media texture on it. You can apply this option to any 3-D object no matter which media file texture is applied to it. This parameter provides an option to view a 3-D object without displaying the associated texture.

Modifier 1: Increases red color component from 0 = no adjustment to 255 (100%) = maximum red saturation.

Modifier 2: Increases blue color component from 0 = no adjustment to 255 (100%) = maximum blue saturation.

Modifier 3: Increases green color component from 0 = no adjustment to 255 (100%) = maximum green saturation.

Glow Color Cycle

☑ Object Effect ☐ Global Effect

Effect Mode parameter DMX value = 74

Glow colorizes and creates a glow on the 3-D object separate from the media texture on it. You can apply this option to any 3-D object no matter which media file texture is applied to it. This parameter provides an option to view a 3-D object without an associated texture.

Modifier 1: Defines the red color component speed. A DMX value of 128 (50%) = default cycle speed. DMX Values above the midpoint increase cycle speed in a forward direction to 255 (100%) = fastest change speed. DMX values below the midpoint increase cycle speed in a backward direction to 0 = fastest change speed.

Modifier 2: Defines the green color component speed in the same way as Modifier 1.

Modifier 3: Defines the blue color component speed in the same way as Modifier 1.

Intensity Key

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 45

This option turns pixels of a selected intensity transparent or applies the reverse effect.

Modifier 1: Selects intensity from a DMX value of 0 = no intensity to 255 (100%) = full intensity.

Modifier 2: Selects intensity bandwidth from a DMX value of 0 = narrowest bandwidth to 255 = widest bandwidth.

Modifier 3: Turns selected intensity range transparent from 0 = no change to 128 = fully transparent. DMX values above the midpoint of the range change all intensities outside of the selected range transparent from 129 = no transparency to 255 = full reverse transparency.

Mask Color

☐ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 128

This option applies color to a selected mask shape

Modifier 1: Increases red color component from 0 = no adjustment to 255 (100%) = maximum red saturation.

Modifier 2: Increases blue color component from 0 = no adjustment to 255 (100%) = maximum blue saturation.

Modifier 3: Increases green color component from 0 = no adjustment to 255 (100%) = maximum green saturation.

Mask Color and Edge Fade Color

☐ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 130

This option applies a color to both the selected Mask shape and any selected Edge parameter. Color can also be applied to Mask shape (see *Picture in Picture* on page 145) and Edge parameter(s) separately.

Modifier 1: Increases red color component from 0 = no adjustment to 255 (100%) = maximum red saturation.

Modifier 2: Increases blue color component from 0 = no adjustment to 255 (100%) = maximum blue saturation.

Modifier 3: Increases green color component from 0 = no adjustment to 255 (100%) = maximum green saturation.

RGB Add, All Pixels

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 4

This option adds color to all pixels including black using the RGB color model.

Modifier 1: Increases red color component from 0 = no adjustment to 255 (100%) = maximum red saturation.

Modifier 2: Increases blue color component from 0 = no adjustment to 255 (100%) = maximum blue saturation.

Modifier 3: Increases green color component from 0 = no adjustment to 255 (100%) = maximum green saturation.

RGB Add2, All Pixels

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 5

This option adds color to all pixels including black using the RGB color model.

Modifier 1: Increases red color component from 0 = no adjustment to 255 (100%) = maximum red saturation.

Modifier 2: Increases blue color component from 0 = no adjustment to 255 (100%)= maximum blue saturation.

Modifier 3: Increases green color component from 0 = no adjustment to 255 (100%) = maximum green saturation.

RGB Add to Non-black Pixels

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 6

This option adds color to all pixels except black using the RGB color model.

Modifier 1: Increases red color component from 0 = no adjustment to 255 (100%) = maximum red saturation.

Modifier 2: Increases blue color component from 0 = no adjustment to 255 (100%) = maximum blue saturation.

Modifier 3: Increases green color component from 0 = no adjustment to 255 (100%) = maximum green saturation.

RGB Invert

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 17

This option inverts color values to transition the image from an RGB to a CMY color model.

Modifier 1: Transitions the red component from no adjustment at a value of 0 to cyan at a value of 255 (100%)

Modifier 2: Transitions the green component from no adjustment at a value of 0 to magenta at a value of 255 (100%)

Modifier 3: Transitions the blue component from no adjustment at a value of 0 to yellow at a value of 255 (100%)

RGB Invert and Swap to BRG

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 19

This option swaps the color values from RGB to an inverted BRG color model.

Modifier 1: Transitions the red component from no adjustment at a value of 0 to yellow at a value of 255 (100%)

Modifier 2: Transitions the green component from no adjustment at a value of 0 to cyan at a value of 255 (100%)

Modifier 3: Transitions the blue component from no adjustment at a value of 0 to magenta at a value of 255 (100%)

RGB Invert and Swap to GBR

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 18

This option swaps the color values from RGB to an inverted GBR color model.

Modifier 1: Transitions the red component from no adjustment at a value of 0 to magenta at a value of 255 (100%)

Modifier 2: Transitions the green component from no adjustment at a value of 0 to yellow at a value of 255 (100%)

Modifier 3: Transitions the blue component from no adjustment at a value of 0 to cyan at a value of 255 (100%)

RGB Scale

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 47

Reduce and increase color components in the image as a part of the overall color range.
Note: the maximum of Mod1, Mod2 and Mod3 sets overall color range.

Modifier 1: Scales Red in the Media file. A DMX Value of 128 = no adjustment. DMX values below 128 (50%) reduce color value. DMX values over 128 increase color value.

Modifier 2: Scales Green in the Media file. A DMX Value of 128 = no adjustment. DMX values below 128 (50%) reduce color value. DMX values over 128 increase color value.

Modifier 3: Scales Blue in the Media file. A DMX Value of 128 = no adjustment. DMX values below 128 (50%) reduce color value. DMX values over 128 increase color value.

RGB Swap to BGR

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 41

This option allows you to swap colors. All red values become green and all blue values become red. Green values are unaffected.

Modifier 1: Transitions red color component to blue from 0 = no color change to 255 (100%) = green

Modifier 2: No change to green color component

Modifier 3: Transitions blue color component to green from 0 = no color change to 255 (100%) = red

RGB Swap to BRG

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 8

This option allows you to swap colors. All red values become blue, all green values become red and all blue values become green.

Modifier 1: Transitions red color component to blue from 0 = no color change to 255 (100%) = blue

Modifier 2: Transitions green color component to red from 0 = no color change to 255 (100%) = red

Modifier 3: Transitions blue color component to green from 0 = no color change to 255 (100%) = green

RGB Swap to GBR

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 7

This option allows you to swap colors. All red values become green, all green values become blue and all blue values become red.

Modifier 1: Transitions red color component to green from 0 = no color change to 255 (100%) = green

Modifier 2: Transitions green color component to blue from 0 = no color change to 255 (100%) = blue

Modifier 3: Transitions blue color component to red from 0 = no color change to 255 (100%) = red

RGB Swap to GRB

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 43

This option allows you to swap colors. All red values become green and all green values become blue. Blue values are unaffected.

Modifier 1: Transitions red color component to green from 0 = no color change to 255 (100%) = green

Modifier 2: Transitions green color component to red from 0 = no color change to 255 (100%) = blue

Modifier 3: No change to blue color component

RGB Swap to RBG

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 42

This option allows you to swap colors. All green values become blue and all blue values become green. Red values are unaffected.

Modifier 1: No change to red color component

Modifier 2: Transitions green color component to blue from 0 = no color change to 255 (100%) = blue

Modifier 3: Transitions blue color component to green from 0 = no color change to 255 (100%) = red

Scan Line

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 32

Maps image color intensities to the colors in a single horizontal line of the selected texture.

Modifier 1: Selects a line of the media file to scan

Modifier 2: Adjusts the mapping transition

Modifier 3: Not used

Solarize

☑ Object Effect ☑ Global Effect

Solarize 1

Effect Mode parameter DMX value = 9

Solarize 2

Effect Mode parameter DMX value = 10

Solarize 3

Effect Mode parameter DMX value = 11

Solarize 4

Effect Mode parameter DMX value = 12

Each of the Solarize options remaps colors to a narrow value range and inverts the color below a set threshold using different algorithms. Solarize options can create strong highlights.

Modifier 1: Increases red color component from 0 = no adjustment to 255 (100%) = maximum red saturation. Red color values below the threshold are converted to cyan.

Modifier 2: Increases blue color component from 0 = no adjustment to 255 (100%) = maximum blue saturation. Blue color values below the threshold are converted to magenta.

Modifier 3: Increases green color component from 0 = no adjustment to 255 (100%) = maximum green saturation. Green color values below the threshold are converted to yellow.

Solid Color RGB

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 16

Solid Color RGB removes the media file texture and allows you to color mix the 3-D object to one solid color

Modifier 1: Increases red color component from 0 = no adjustment to 255 (100%) = maximum red saturation.

Modifier 2: Increases green color component from 0 = no adjustment to 255 (100%) = maximum green saturation.

Modifier 3: Increases blue color component from 0 = no adjustment to 255 (100%) = maximum blue saturation.

Geometric Effect Options

Cartoon Edge

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 38

Outlines the edges of image components to create a cartoon effect.

Modifier 1: Adjusts Color reduction from 0= no adjustment to 255 (100%) = maximum.

Modifier 2: Adjusts contrast enhancement from 0= no adjustment to 255 (100%) = maximum.

Modifier 3: Adjusts edge detection sensitivity from 0= no adjustment to 255 (100%) = maximum adjustment.

Collage Generator

☐ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 134 (Standard) or DMX value = 141 (Enhanced).

> ***NOTE:*** ***The Standard Collage Generator option should only be used with legacy shows. The Enhanced Collage Generator option's higher resolution for arrays provides the best output.***

The DL2 **Standard Collage Generator** enables multiple DL2 units to create virtually seamless panoramic media projections controlled from a DMX console. You can display either stock or custom content. For more information about this global effect option, see *Chapter 11: Global Functions: Collage Generator™ Effect* on page 101.

The **Enhanced Collage Generator** option (DMX = 141) provides cleaner images and better edge blending.

Modifier 1: Selects which type of collage array to use from DMX Values 1-63. A DMX value of 0 = No collage. DMX Values of 64-255 are reserved and default to No collage.

Modifier 2: Selects which portion of the grid a particular DL2 will display. DMX values 0-63 step through grid pattern selected by the Modifier 1 parameter. DMX values 64-255 default to the upper left corner of the grid.

Modifier 3: Adjusts edge blending between the selected portion of the image being projected by the fixture and adjacent portions being projected by other fixtures.

Chroma Shift

☑ Object Effect ☑ Global Effect

Visual Mode parameter DMX value = 21

This option shifts the red, blue, and green component colors in an image. You can offset color components vertically and or horizontally.

Modifier 1: The default DMX value of 128 (50%) = no adjustment. Values below the midpoint shift the color components right to a maximum at a value of 0. Values above the midpoint shift the color components left to a maximum at a value of 255 (100%).

Modifier 2: The default DMX value of 128 (50%) = no adjustment. Values below the midpoint shift the color components down to a maximum at a value of 0. Values above the midpoint shift the color components up to a maximum at a value of 255 (100%).

Modifier 3: Not Used

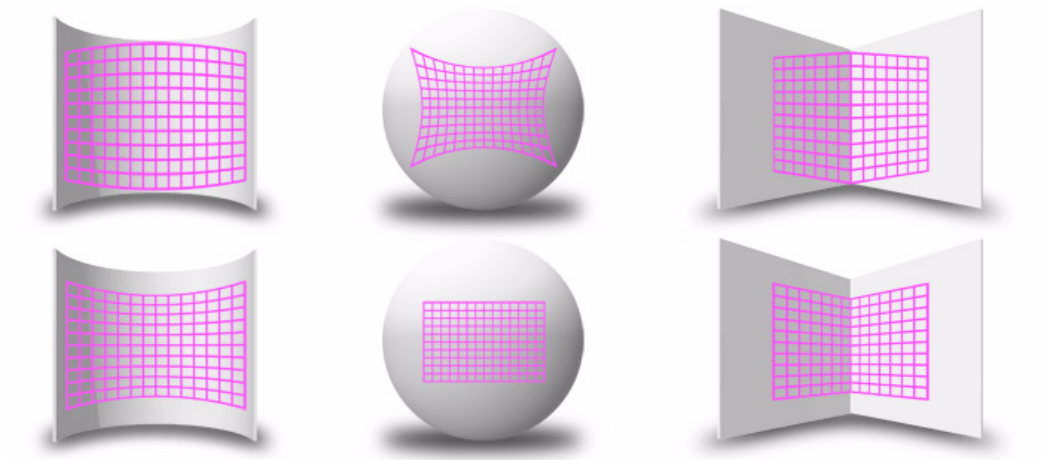
NOTE: This option is also available as a Visual Mode adjusted with 2 Modifier parameters, (see **Chroma Shift** *on page 61).*

Curved Surface Support

☐ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 135-140

Curved Surface Support corrects for shape distortions that occur when you project onto surfaces that aren't flat. This Global effect option facilitates projecting onto convex or concave cylinders, angular screens, spheres, and disk shaped surfaces.



You can apply this correction to any media server output including multi-fixture image panoramas created with the Collage Generator Global Effect option, (see *Global Functions: Collage Generator™ Effect* on page 101).

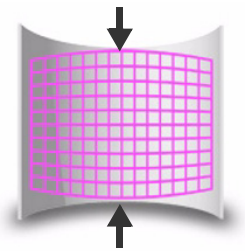
Use these adjustments in conjunction with Keystone parameters and Ratio parameters to refine the output shape on any of these surfaces.

DMX Value	Surface
135	Curved Vertical Convex Cylinder (opening toward projector)
136	Curved Vertical Concave Cylinder (opening away from projector)
137	Vertical Inside Corner (opening toward projector)
138	Vertical Outside Corner (opening away from projector)
139	Sphere
140	Convex Disk (opening away from projector)

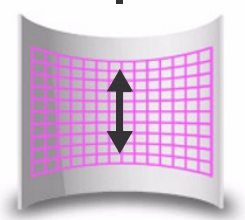
After you have selected the surface, the Modifier parameters operate as described below:

TIP: Modifier channels for Effect Mode 1 are labeled as CMY in the Wholehog 3 system so you can also make use of the color picker, HSI, and other Wholehog 3 functions. Use the CMY parameter controls to adjust the three Effect Mode 1 Modifier parameters for both the Global and Graphic fixture types. The default for Effect Mode 1 is set to CMY1 as well. Effect Mode 2 Modifier channels are labeled Mod 1, Mod 2, and Mod 3.

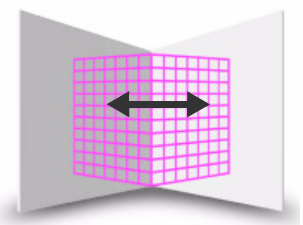
Modifier 1: Modifier 1 lets you adjust the amount of correction vertically. A value of 0 = no adjustment. The correction increases as you increase value to maximum at 255 (100%).



Modifier 2: In situations where you are projecting from any angle other than perpendicular to the surface, you can use the Modifier 2 to adjust the vertical center of the image. A DMX value of 128 (50%) = no adjustment. Adjusting toward 0 moves the vertical center down to the bottom of the image. Values above the midrange move the vertical center up to the top of the image at a DMX value of 255 (100%).



Modifier 3: You can use the Modifier 3 parameter to adjust the image's horizontal center when you're projecting onto a sphere, an inside or an outside corner. A DMX value of 128 (50%) = no adjustment. Adjusting toward 0 moves the horizontal center toward the left edge of the image. Values above the midrange move the horizontal center right toward the edge of the image at a DMX value of 255 (100%).



NOTE: Modifier 3 is not used when projecting onto an inside or outside cylinder

Downward Vertical Streaks

☑ Object Effect ☑ Global Effect

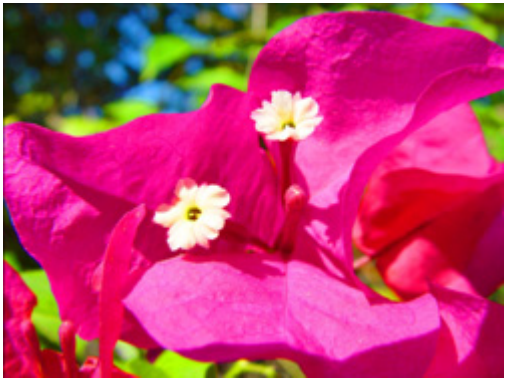
Effect Mode parameter DMX value = 80

This option lets you convert a portion of the image into vertical streaks. You can also rotate the angle of the streak and fade from the original image to the image with the streak option applied.

Modifier 1: At a DMX value of 0, there is no effect. Increasing the DMX value sets the length of the streak portion of the image from the bottom up to 255 (100%) = to the full image converted to streaks.

Modifier 2: The default DMX value of 128 (50%) = no adjustment. Values below the midpoint move the edge of the streaked portion of the image clockwise as you approach 0 = 90°. Values above the midpoint move the edge of the streaked portion of the image counterclockwise as you approach 90° at a value of 255 (100%).

Modifier 3: When Modifier 1 has a DMX value > 0, Modifier 3 lets you fade from the original image at a DMX value = 0 to the converted image at a DMX value of 255 (100%).



Original Graphic Object media file content

Original Graphic Object media file content
Modifier 1 = 170, Modifier 2 = 158,
Modifier 3 = 255

Drop Shadow

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 58

This option creates a black plane behind the selected media file texture on a flat rectangular object. You can bring the plane from behind positioning it to form a drop shadow. You won't see the shadow until you select a Modifier 1 or 2 DMX value above or below 128 (50%).

Modifier 1: The default DMX value of 128 (50%) = no adjustment. Values below the midpoint move the "shadow" right as you approach 0 = maximum horizontal shadow width. Values above the midpoint move the "shadow" left to a maximum horizontal shadow width at a value of 255 (100%)

Modifier 2: The default DMX value of 128 (50%) = no adjustment. Values below the midpoint move the "shadow" down as you approach 0 = maximum vertical shadow width. Values above the midpoint move the "shadow" up to a maximum vertical shadow width at a value of 255 (100%)

Modifier 3: Adjusts the shadow's opacity from full opacity at a DMX value of 0 to minimum opacity at a value of 255 (100%).

Tip: To ensure that the shadow remains black and is unaffected by other graphic effects, apply it as the last effect option selected for an image.

NOTE: This option is also available as a Visual Mode adjusted with 2 Modifier parameters, (see **Drop Shadow** *on page 62).*

Edge Detect Black and White

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 21

This option displays only the edges of image components. Edges appear white, everything else is black.

Modifier 1: Adjusts horizontal edge search size from 0= no adjustment to 255 (100%) = maximum adjustment.

Modifier 2: Adjusts vertical edge search size from 0= no adjustment to 255 (100%) = maximum adjustment.

Modifier 3: Adjusts comparison edge threshold from 0= no adjustment to 255 (100%) = maximum adjustment.

Edge Detect Color

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 20

This option displays only the edges of image components with their color values.

Modifier 1: Adjusts horizontal edge search size from 0= no adjustment to 255 (100%) = maximum adjustment.

Modifier 2: Adjusts vertical edge search size from 0= no adjustment to 255 (100%) = maximum adjustment.

Modifier 3: Adjusts comparison edge threshold from 0= no adjustment to 255 (100%) = maximum adjustment

Faux LED

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 55

This options divides the image into a grid of circles to mimic an LED wall. The color of the center pixel in each cell defines the solid color for that circle. You can control "LED" size, background and color peaking.

Modifier 1: Controls the "LED" size. The default DMX value of 0 displays a 100 x 100 grid of "LEDs". Increasing the DMX value decreases the grid divisions to a minimum of 10 x 10 at a value of 255 (100%).

NOTE: A small number of larger "LEDs" will also result in reduced color variation.

This option is also available as a Visual Mode adjusted with 2 Modifier parameters, (see Faux LED on page 64).

Modifier 2: Adjusts the grid spacing and color around each "LED". A DMX value of 0 = the minimum black line between cells. The spacing increases to a maximum at a DMX value of 127 (49%). At a value of 128 (50%), the space between cells reverts to the minimum spacing and turns white. Increasing the value further increases the white spacing to a maximum at a DMX value of 255 (100%).

Modifier 3: Adjusts the color peaking to simulate lighting at the "LED" center. A DMX value of 0 = no adjustment and flat color across the cell. As you increase the DMX value, the peaking increases to a maximum at 255 (100%).

Faux Tile

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 56

This options creates divides the image into a grid of tiles with simulated lighting at the edges. The color of the center pixel in each cell defines the solid color for that tile. You can control the number and spacing of tile, choose between a black and white grid and adjust color peaking.

Modifier 1: Controls the tile size. The default DMX value of 0 displays a 100 x 100 grid of tiles. Increasing the DMX value decreases the grid divisions to a minimum of 10 x 10 at a value of 255 (100%).

NOTE: A small number of larger "tiles" will also result in reduced color variation.

This option is also available as a Visual Mode adjusted with 2 Modifier parameters, (see **Faux Tile** *on page 65).*

Modifier 2: Adjusts the grid spacing and color around each tile. A DMX value of 0 = the minimum black line between tiles. The spacing increases to a maximum at a DMX value of 127 (49%). At a value of 128 (50%), the space between tiles reverts to the minimum spacing and turns white. Increasing the value further increases the white spacing to a maximum at a DMX value of 255 (100%).

Modifier 3: Adjusts the color peaking to simulate lighting at the tile edges. A DMX value of 0 = no adjustment and flat color across the tile. As you increase the DMX value, the peaking increases to a maximum at 255 (100%).

Film Roll

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 53

This option scrolls the media file texture horizontally or vertically independent from the 3-D object it overlays, and allows you to control the scrolling speed and image scaling.

Modifier 1: The default DMX value of 128 (50%) = no adjustment. Values below the midpoint scroll left, increasing in speed as you approach 0. Values above the midpoint scroll right, increasing in speed to 255 (100%).

Modifier 2: The default DMX value of 128 (50%) = no adjustment. Values below the midpoint scroll down, increasing in speed as you approach 0. Values above the midpoint scroll up, increasing in speed to 255 (100%).

Modifier 3: Scales the image from 0 = no adjustment to maximum tiling at 255.

NOTE: This option is also available as a Visual Mode adjusted with 2 Modifier parameters, (see **Film Roll** *on page 66).*

Framing

☐ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 133

This option contains three modes that modify the appearance or the operation of the **Global Image Edge Fade** parameters to frame the global composite image. Modifier 2 and Modifier 3 adjustments vary depending which of the framing modes is selected with Modifier 1.

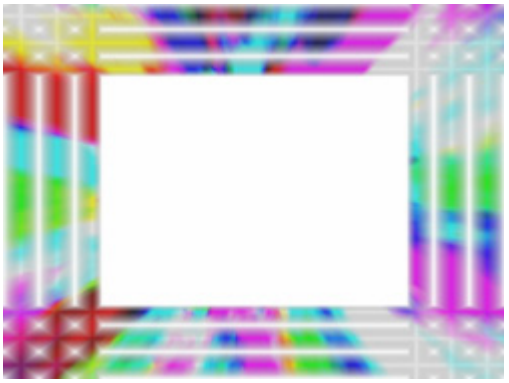
NOTE: If the Global Image Edge Fade DMX values are set to Zero, the Framing output will be unseen in modes 0 and 1.

The images below show examples of the first two framing modes. In the image on the left Modifier 1 selects the internal profile framing option, with Modifier 2 selecting the frame pattern.

In the example on the right, Modifier 1 selects the Graphic Object texture framing option, with Modifier 2 selecting the frame pattern. A Modifier 3 DMX value = 10 designates the Frame texture as Graphic Object 2's media file content minus any applied effects.

NOTE: Global Image Edge Fade DMX values = 100.

Effect Mode parameter = 133
Modifier 1 DMX = 0, Modifier 2 DMX = 15
Modifier 3 Not Used



Effect Mode parameter = 133
Modifier 1 DMX = 1, Modifier 2 DMX = 251
Modifier 3 DMX = 10

Framing Shutter Emulation

When Modifier 1 is set to a DMX value = 2, Modifier parameters 2 and 3 are not used. Instead, the four Global Image Edge Fade parameters control image to emulate framing shutters. In the example to the right, each Image Edge Fade parameter has been set to a DMX value = 100.

NOTE: When emulating framing shutters, the image being framed does not change. This differs from Keystone Correction that modifies the image shape.

Modifier 1: This parameter allows you to select from three framing modes.

DMX Value	Action
0	Frames the image using an Internal Frame profile to control the Global Fade Edge parameter appearance.
1	Frames the image using an Internal Frame profile to control the Global Fade Edge parameter appearance. Rendered Graphic Object content is selected at Frame texture using Modifier 3 parameter
2	Image clipping changing operation of the Global Image Edge Fade parameters to Emulate Framing Shutters

Modifier 2: When the Modifier 1 DMX value = 0 or 1, this channel selects from profiles that vary in gradient density or pattern. When Modifier 1 DMX value = 2, this Modifier is not used.

Modifier 3: When Modifier 1 DMX Value = 1, this parameter determines how to use the rendered Graphic Object content as a texture for the frame. The image below shows an examples of

Modifier 1 DMX Value	Modifier 3	
	DMX value	Action
0	NA	Not Used
1	0	Graphic Object 1 texture without applied Effects
	1	Graphic Object 1 texture including its first applied Effect
	2	Graphic Object 1 texture including its first two applied Effects
	3	Graphic Object 1 texture including its first three applied Effects
	10	Graphic Object 2 texture without applied Effects
	11	Graphic Object 2 texture including its first applied Effect
	12	Graphic Object 2 texture including its first two applied Effects
	13	Graphic Object 2 texture including its first three applied Effects
	20	Graphic Object 3 texture without applied Effects
	21	Graphic Object 3 texture including its first applied Effect
	22	Graphic Object 3 texture including its first two applied Effects
	23	Graphic Object 3 texture including its first three applied Effects
2	NA	Not Used

Fuzzifier

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 57

This option offsets multiple images of the media file texture to blur the image, and lets you to control image scaling at the same time.

Modifier 1: The default DMX value of 0 = no adjustment. Increasing DMX values blur the image horizontally to a maximum at a DMX value of 255 (100%).

Modifier 2: The default DMX value of 0 = no adjustment. Increasing DMX values blur the image vertically to a maximum at a DMX value of 255 (100%).

Modifier 3: Adjusts the decay level of the blurred edge from 0 = no adjustment to maximum full decay at 255.

NOTE: This option is also available as a Visual Mode adjusted with 2 Modifier parameters, (see **Fuzzifier** *on page 67).*

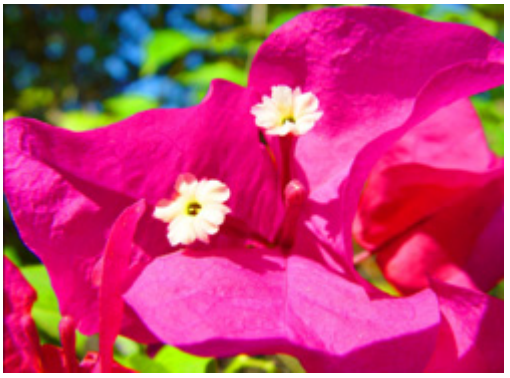
Gaussian Blur

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 81

More precise than "Fuzzifier" option, this option creates a true blur effect utilizing a gaussian curve.

Modifiers 1 and **Modifier 2** combine to create the effect. When Modifiers 1 and 2 both have a value >0, **Modifier 3** can be adjusted to scale the effect.



Original Content with Effect Mode = 81

Effect Mode = 81, Modifier 1 = 128, Modifier 2 = 128, Modifier 3 = 128

Effect Mode = 81, Modifier 1 = 255, Modifier 2 = 255, Modifier 3 = 255

Horizontal Mirror

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 40

This option duplicates the image vertically and mirrors the image alongside it's original.

Modifier 1: The default DMX value of 128 (50%) sets the center point of the edge where the duplicate images meet at the center of the screen. Values below the midpoint move the center point toward the left as you approach 0. Values above the midpoint move the center point toward the right as you approach 255 (100%).

Modifier 2: Not Used

Modifier 3: Not Used

Image Scale and Rotate

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 52

This option lets you scale and rotate the media file texture applied to a 3-D object's surface independent of Graphic Object rotation you set with the Rotation parameters (see *Rotating a 3-D Object* on page 45). This allows scaling and rotating outside the bounds of the 3D object.

Modifier 1: Scales the texture. The default DMX value of 0 = no adjustment. As you increase the DMX value to 255 (100%), the single image to scales to an increasing number of multiple images similar to tiling.

Modifier 2: Sets the texture rotation angle. A DMX value of 128 (50%) = no adjustment. Values above the midpoint rotate clockwise 255 (100%) = maximum rotation. Values below the midpoint rotate counterclockwise to 0=maximum rotation.

Modifier 3: Sets the rotation speed from a DMX value of 0 = static to 255 (100%) = maximum rotation speed.

Tip: Try combining image rotate and object rotate for a multiple effect

Magnifying Lens

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 36

This option applies spherical overlay that magnifies a portion of the texture to create a virtual convex lens effect over a portion of the image. You can adjust the size of the lens and *move* it over different areas of the image.

Modifier 1: Controls the horizontal position of the lens' centerpoint from 0=left edge to 255 (100%) = right edge of output.

Modifier 2: Controls the vertical position of the lens' centerpoint from 0=top edge to 255 (100%) = bottom edge of output.

Modifier 3: Controls the size of the lens from 0=smallest to 255 (100%) = largest.

Magnifying Lens 2

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 37

This option applies spherical overlay that magnifies a portion of the texture to create a doubled virtual convex lens over a portion of the image. You can adjust the size of the lens and *move* it over different areas of the image.

Modifier 1: Controls the horizontal position of the lens' centerpoint from 0=left edge to 255 (100%) = right edge of output.

Modifier 2: Controls the vertical position of the lens' centerpoint from 0=top edge to 255 (100%) = bottom edge of output.

Modifier 3: Controls the size of the lens from 0=smallest to 255 (100%) = largest.

Tip: Zooming in with this lens option creates an additional effect.

Mattes

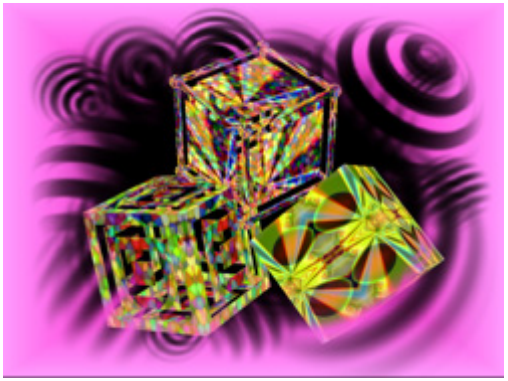
☐ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 144

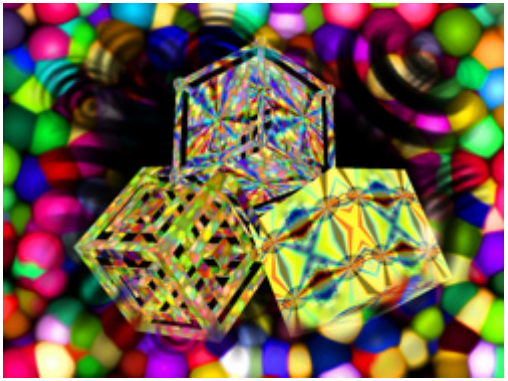
The Global Effect option lets you select from a variety of provided patterns to superimpose over the composite image. Modifier parameters select the pattern and effects for a matte.

The images below show two examples of the Mattes option. In the image on the left, the Modifier 2 value selected the matte pattern. Modifier 1 sets black as transparent. The Modifier 3 value corresponds with a lookup to an internal gradient map to determine the matte color.

In the example on the right, the same Matte is selected by Modifier 2. This time the Modifier 1 value selects white as transparent and uses a graphic object as a texture. A Modifier 3 DMX value of 0 designates the Matte texture as Graphic Object 1's media file content minus any applied effects.



Modifier 1 DMX = 11
Modifier 2 DMX = 13
Modifier 3 DMX = 203

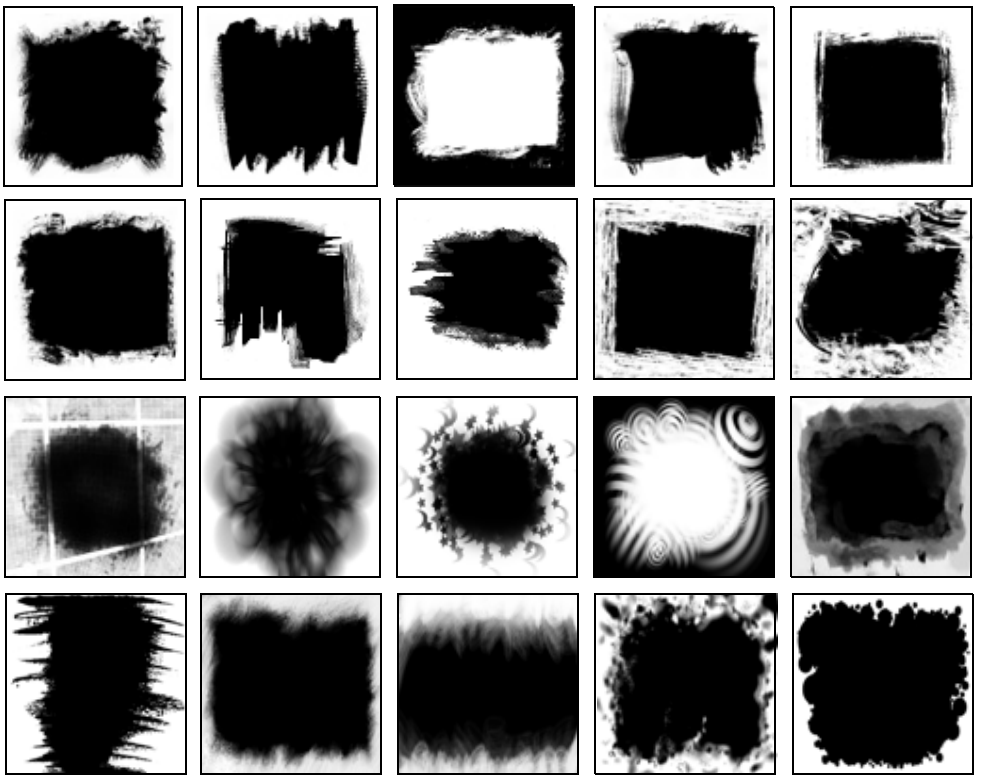


Modifier 1 DMX = 5
Modifier 2 DMX = 13
Modifier 3 DMX = 0

Modifier 1: This parameter determines transparency and color options for the selected matte:

DMX value	Modifier 1 Action
0	Black transparent, use matte color
1	Black transparent, inverting matte color
2	White transparent, use matte color
3	White transparent, then invert matte color
4	Black transparent using a Graphic Object media file content as the matte texture
5	White transparent using a Graphic Object media file content as the matte texture
6	Black transparent with grayscale used as alpha
7	White transparent with grayscale used as alpha
8	Black transparent with grayscale not used as alpha
9	White transparent with grayscale not used as alpha
10	Black transparent, with matte color controlled by Modifier 3 as lookup in internal color gradient map
11	Black transparent, with matte color controlled by Modifier 3 as lookup in internal color gradient map and inverted

Modifier 2: The first 20 DMX values are assigned to the following Matte pattern options:



Modifier 3: This parameter determines the texture for the Matte mode selected with the Modifier 1 parameter.

Modifier 1 DMX Value	Modifier 3	
	DMX value	Action
0 - 3	NA	Not Used
4 - 9	0	Graphic Object 1 texture without applied Effects
	1	Graphic Object 1 texture including its first applied Effect
	2	Graphic Object 1 texture including its first two applied Effects
	3	Graphic Object 1 texture including its first three applied Effects
	10	Graphic Object 2 texture without applied Effects
	11	Graphic Object 2 texture including its first applied Effect
	12	Graphic Object 2 texture including its first two applied Effects
	13	Graphic Object 2 texture including its first three applied Effects
	20	Graphic Object 3 texture without applied Effects
	21	Graphic Object 3 texture including its first applied Effect
	22	Graphic Object 3 texture including its first two applied Effects
	23	Graphic Object 3 texture including its first three applied Effects
10 - 11	0-255	Color selected as a look up value from an internal gradient.

Pan and Scan

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 255

This option Zooms into a still image and then, by changing position, you can pan across the image horizontally and vertically. It only functions on image sizes greater than 1024 x 1024 in at least one direction.

Modifier 1: Adjusts the horizontal pan position from 0=left edge to 255 (100%) = right edge of the image. The default DMX value of 128 (50%) = no adjustment.

Modifier 2: Adjusts the vertical pan position from 0 = bottom edge to 255 (100%) = top edge of the image. The default DMX value of 128 (50%) = no adjustment.

Modifier 3: The default DMX value is 0 = no zoom. Increasing the value, increases the zoom into the image to a maximum at a value of 255 (100%). The total Zoom range is proportional to the image size.

Tip: Although you can apply this effect in several different modes (global, graphic and visual), the modifier channel adjustments will only function if there is enough "room" left on the image to move. In most cases the first application of this effect option will be the only one to have an effect.

NOTE: This option is also available as a Visual Mode adjusted with 2 Modifier parameters, (see **Pan and Scan** *on page 72).*

Picture in Picture

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 35

This options creates a window in the image containing a scaled down version of the same image and then lets you position it anywhere on the output plane.

Modifier 1: Controls the horizontal position of the subpicture's centerpoint from 0=left edge to 255 (100%) = right edge of output.

Modifier 2: Controls the vertical position of the subpicture's centerpoint from 0=top edge to 255 (100%) = bottom edge of output.

Modifier 3: Controls the size of the picture from 0=smallest to 255 (100%) = largest.

Pixelate

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 54

This options divides the image into rectangles using the center pixel color of each "box" as it's color. You can control the number of boxes, and adjust the vertical and horizontal dimensions.

Modifier 1: Controls the number of divisions. Fewer, larger boxes will also result in reduced color variations.

Modifier 2: Reduces the box size horizontally to centerpoint from 0= no reduction to 255 (100%) = full reduction. At that point, the image will then be composed of series of horizontal bands.

Modifier 3: Reduces the box size vertically to centerpoint from 0= no reduction to 255 (100%) = full reduction. At that point, the image will then be composed of series of vertical bands.

NOTE: This option is also available as a Visual Mode adjusted with 2 Modifier parameters, (see **ShakeNBake** *on page 77).*

Pixel Twist

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 34

This option introduces a twisted area to the image and allows to you size it and move it in the image.

Modifier 1: Controls the horizontal position of the twisted area's centerpoint from 0=left edge to 255 (100%) = right edge of output.

Modifier 2: Controls the vertical position of the twisted area's centerpoint from 0=top edge to 255 (100%) = bottom edge of output.

Modifier 3: Controls the direction and amount of twist. At the midpoint of the range, there is no change in the image. The twist area and size moves counterclockwise from 128 (50%) = smallest area to 0 = largest twist area moving counterclockwise. The twist area and size moves clockwise from 128 (50%) = smallest area to 255 (100%)= largest twist area moving clockwise.

Raindrop

☑ Object Effect ☑ Global Effect

Effects Mode parameter DMX value = 46

This option simulates raindrops falling on a liquid surface.

Modifier 1: Controls the drop size from 0 = no drop to 255 (100%) = maximum size.

Modifier 2: Sets the random number generator seed number. This lets you create a repeatable random sequence that will synchronize correctly when using the collage generator option, see *page 131*.

Modifier 3: Adjusts the raindrop creation rate from 0 = no adjustment to 255 (100%) = maximum rate.

ShakeNBake

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 61

This option randomly vibrates the image. You can control the horizontal and vertical frequency.

Modifier 1: Adjusts random horizontal "shake" from the shortest refresh rate at a value = 0 to to a maximum at a DMX value of 255 (100%).

Modifier 2: Adjusts random vertical "shake" from the shortest refresh rate at a value = 0 to a maximum at a DMX value of 255 (100%).

Modifier 3: Adjusts how much the image is allowed to move from a minimum at a DMX value of 0 to a maximum at a DMX value of 255 (100%).

Tip: To get the maximum effect, set a high value for Modifier 3 and low values for Modifiers 1 and 2.

NOTE: This option is also available as a Visual Mode adjusted with 2 Modifier parameters, (see ShakeNBake *on page 77).*

Sinewave, Circular

☑ Object Effect ☐ Global Effect

Sinewave, Circular w/X-axis Wobbulation

Effect Mode parameter DMX value = 64

Sinewave, Circular w/Y-axis Wobbulation

Effect Mode parameter DMX value = 65

Sinewave, Circular w/Z-axis Wobbulation

Effect Mode parameter DMX value = 66

These options create a circular sinewave pattern and then vary the boundaries of the underlying object along the designated axis without affecting the media file that is applied as a texture.

Modifier 1: Adjusts the size (amplitude) of the wobble from 0 = no adjustment to 255 (100%) = maximum size.

Modifier 2: Adjusts the rate (frequency) of the wobble from 0 = no adjustment to 255 (100%) = maximum rate

Modifier 3: Adjusts the offset (phase) of the wobble from 0 = no adjustment to 255 (100%) = maximum offset

Sinewave, Horizontal

☑ Object Effect ☐ Global Effect

Sinewave, Horizontal w/X-axis Wobbulation

Effect Mode parameter DMX value = 67

Sinewave, Horizontal w/Y-axis Wobbulation

Effect Mode parameter DMX value = 68

Sinewave, Horizontal w/Z-axis Wobbulation

Effect Mode parameter DMX value = 69

These options create a horizontal sinewave pattern and then vary the boundaries of the underlying object along the designated axis without affecting the media file that is applied as a texture.

Modifier 1: Adjusts the size (amplitude) of the wobble from 0 = no adjustment to 255 (100%) = maximum size.

Modifier 2: Adjusts the rate (frequency) of the wobble from 0 = no adjustment to 255 (100%) = maximum rate

Modifier 3: Adjusts the offset (phase) of the wobble from 0 = no adjustment to 255 (100%) = maximum offset

Sinewave, Vertical

☑ Object Effect ☐ Global Effect

Sinewave, Vertical w/X-axis Wobbulation

Effect Mode parameter DMX value = 70

Sinewave, Vertical w/Y-axis Wobbulation

Effect Mode parameter DMX value = 71

Sinewave, Vertical w/Z-axis Wobbulation

Effect Mode parameter DMX value = 72

This option creates a Vertical sinewave pattern and then varies the boundaries of the underlying object along the x-axis without affecting the media file that is applied as a texture.

Modifier 1: Adjusts the size (amplitude) of the wobble from 0 = no adjustment to 255 (100%) = maximum size.

Modifier 2: Adjusts the rate (frequency) of the wobble from 0 = no adjustment to 255 (100%) = maximum rate.

Modifier 3: Adjusts the offset (phase) of the wobble from 0 = no adjustment to 255 (100%) = maximum offset.

Slats

☑ Object Effect ☑ Global Effect

Vertical Slats

Effect Mode parameter DMX value = 62

Horizontal Slats

Effect Mode parameter DMX value = 63

These options render the image in offset slats.

Modifier 1: Adjusts the number of slats from from a DMX value of 0 = no slate to 255 = the maximum number of slats.

Modifier 2: Adjusts the displacement of the slats from a DMX value of 0 = no displacement to 255 = image completely removed from screen.

Original content

Modifier 3: When the DMX value for Modifier 1 >0, Modifier 3 fades from the original image to the slatted image. A DMX value of 0 = the original image with no effect applied. Increasing the value fades to the slatted image with 255 = the slatted image at full opacity.

Vertical Slat Option

Effect Mode parameter DMX value = 62
Modifier 1 =204, Modifier 2 =40,
Modifier 3 = 255

Horizontal Slat Option

Effect Mode parameter DMX value = 63
Modifier 1 =204, Modifier 2 =40,
Modifier 3 = 255

Spherical Mapping

☐ Object Effect ☑ Global Effect

Spherical Mapping adjusts a rectangular output to project on a portion of a sphere. It is especially useful for projecting a collage onto a sphere or a portion of a sphere. Spherical mapping utilizes a total of nine Effect Modifier parameters to adjust positioning. In addition to the three modifiers associated with the Global Effect, two Graphics Object Effects provide six additional Modifier parameters. Use these adjustments in conjunction with Keystone parameters and Ratio parameters to refine the output shape on the spherical surface.

For a more detailed setup guide for Spherical Mapping, see *Mapping a Collage to a Spherical Surface* on page 112.

Spherical Mapping, Outside

Effect Mode parameter DMX value = 142

This option corrects shape distortions and controls blending for collages projected onto the outside surface of a sphere.

Spherical Mapping, Inside

Effect Mode parameter DMX value = 143

This Global Effect corrects shape distortions and controls blending for collages projected onto the inside surface of a sphere.

Modifier Parameter Adjustments

When Spherical Mapping is selected, the associated **Global Effect Modifier** parameters adjust

Modifier 1: Adjusts the longitude (horizontal) angle. A value of 0 = no adjustment. The number of degrees of angle increases as you increase value to maximum at 255 (100%).

Modifier 2: Adjusts the latitude (vertical) angle. A value of 0 = no adjustment. The number of degrees of angle increases as you increase value to maximum at 255 (100%).

Modifier 3: Adjusts the center of the latitude angle. A value of 128 = no adjustment and assumes the center of the latitude angle is at the "equator". Values below the midpoint move the center of the latitude angle down from the "equator" to a minimum at 0. Values above the midpoint move the center of the latitude angle above the equator to a maximum at 255.

When the Spherical Mapping option is selected in a Global Effect parameter ***and*** a **Graphic Effect** parameter's DMX value = 253, the **Graphic Effect Modifier** parameters make the following Spherical Mapping adjustments:

Modifier 1: Controls the vertical offset of the projector. A value of 128 = no adjustment. to maximum at 255 (100%). Values below the midpoint compress the grid toward the "equator". Values above the midpoint stretch the horizontal grid lines away from the "equator".

Modifier 2: Adjusts the vertical offset of the sphere. A DMX value of 128 (50%) = no adjustment. Adjusting toward 0 moves the center of the adjustment down toward the bottom of the image. Values above the midrange move the bend center up to the top of the image at a DMX value of 255 (100%).

Modifier 3: Adjusts to the size of the sphere. A DMX value of 64 (25%) = no adjustment. Adjusting toward 0 compresses the grid toward the vertical center. Values above the midrange stretch the grid toward the edges of the image at a DMX value of 255 (100%).

When the Spherical Mapping option is selected in a Global Effect parameter ***and*** a Graphic Effect parameter's DMX value = 254, the Graphic Effect Modifier parameters make the following Spherical Mapping adjustments:

Modifier 1: Corrects the vertical bend. A value of 0 = no adjustment. Values below the midpoint bend the horizontal lines toward the "equator" to a maximum at 255.

Modifier 2: Adjusts the center of the vertical bend. A DMX value of 128 (50%) = no adjustment. Adjusting toward 0 moves the bend center down to the bottom of the image. Values above the midrange move the bend center up to the top of the image at a DMX value of 255 (100%).

Modifier 3: Adjusts the center of the horizontal bend. A DMX value of 64 (25%) = no adjustment. Adjusting toward 0 bends the vertical grid lines toward the center of the output. Values above the midrange bends the lines away from the vertical center to a maximum at 255 (100%).

TIP: ***Modifier channels for Effect Mode 1 are labeled as CMY in the Wholehog 3 system so you can also make use of the color picker, HSI, and other Wholehog 3 functions. Use the CMY parameter controls to adjust the three Effect Mode 1 Modifier parameters for both the Global and Graphic fixture types.***

The default for Effect Mode 1 is set to CMY1 as well. Effect Mode 2 Modifier channels are labeled Mod 1, Mod 2, and Mod 3.

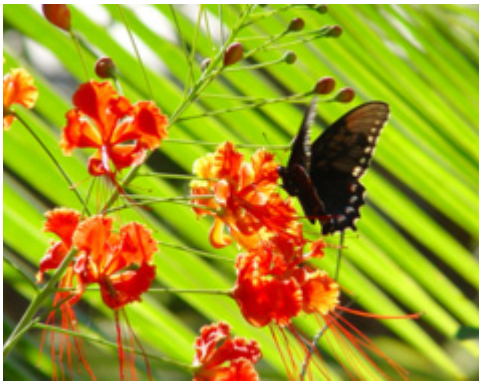
Texture Mixing

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 51

Use Texture Mixing to mix two media file outputs on one object. With this option, you can crossfade the texture (media file content) from one active Graphic Object to the texture of another Graphic Object. When the Texture Mixing option is selected in the example to the right, the media file output of Graphic Object 1 (minus applied effects) is selected and mixed to Graphic Object 2 at an opacity of 50%.

Graphic Object 1 media file content



Graphic Object 2 media file content

Effect Mode parameter DMX value = 51
Modifier 1 =1, Modifier 2 = 0, Modifier 3 = 128

Modifier 1: Selects the Source file for the texture you want to pull. A DMX value = 1 selects the media file content from Graphic Object 1, a value = 2 selects from Graphic Object 2, and a value = 3 selects from Graphic Object 3.

Modifier 2: Selects the effect level you want to use for the source file. A DMX value = 0 selects the original file without effects. If effects have been applied to the image, A DMX value = 1 includes the first applied effect; DMX = 2 includes the first two effects and DMX = 3 includes the first three effects.

Modifier 3: Adjusts Graphic Object opacity of the source texture from a DMX value of 0 = transparent to 255 (100%) = fully opaque.

TIP: Use the following steps create a modified Trails effect with the Texture Mixing option:

1. Select two Graphic Objects. The second object can be a solid black screen (Media Folder 1, Media File 1)
2. Use Modifier 1 to select the Graphic Object you want to display with a trail effect.
3. Set Modifier 2 to a DMX Value = 2
4. Set Modifier 3 in a range between a DMX value of 240-254. The closer to 254, the more exaggerated the trail effect appears. If Modifier 3 is set to 255, the output will appear to stall or freeze on an image.

NOTE: This option is also available as a Visual Mode adjusted with 2 Modifier parameters, (see* Texture Mixing *on page 77).

Texture Ripple, Asymmetrical Circular

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 25

This option varies the distance of reference points to the applied media file texture around the z-axis without affecting the underlying object to create an effect of wavy ripples moving out from the object's center.

Modifier 1: Adjusts the size (amplitude) of the ripple from 0 = no adjustment to 255 (100%) = maximum size.

Modifier 2: Adjusts the rate (frequency) of the ripple from 0 = no adjustment to 255 (100%) = maximum rate

Modifier 3: Adjusts the offset (phase) speed and direction. A DMX value of 128 (50%) = no adjustment. DMX Values above the midpoint increase speed in a forward direction to 255 (100%) = fastest speed. DMX values below the midpoint increase speed in a backward direction from no adjustment to 0 = fastest speed.

Texture Ripple, Circular

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 24

This option varies the distance of reference points to the applied media file texture around the z-axis without affecting the underlying object. This creates an effect of concentric rippling out from the object center.

Modifier 1: Adjusts the size (amplitude) of the ripple from 0 = no adjustment to 255 (100%) = maximum size.

Modifier 2: Adjusts the rate (frequency) of the ripple from 0 = no adjustment to 255 (100%) = maximum rate

Modifier 3: Adjusts the offset (phase) speed and direction. A DMX value of 128 (50%) = no adjustment. DMX Values above the midpoint increase speed in a forward direction to 255 (100%) = fastest speed. DMX values below the midpoint increase speed in a backward direction from no adjustment to 0 = fastest speed.

Texture Ripple, Horizontal

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 22

This option varies the distance of reference points to the applied media file texture around the x-axis without affecting the underlying object.

Modifier 1: Adjusts the size (amplitude) of the ripple from 0 = no adjustment to 255 (100%) = maximum size.

Modifier 2: Adjusts the rate (frequency) of the ripple from 0 = no adjustment to 255 (100%) = maximum rate.

Modifier 3: Adjusts the offset (phase) speed and direction. A DMX value of 128 (50%) = no adjustment. DMX Values above the midpoint increase speed in a forward direction to 255 (100%) = fastest speed. DMX values below the midpoint increase speed in a backward direction from no adjustment to 0 = fastest speed.

Texture Ripple, Vertical

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 23

This option varies the distance of reference points to the applied media file texture around the y-axis without affecting the underlying object.

Modifier 1: Adjusts the size (amplitude) of the ripple from 0 = no adjustment to 255 (100%) = maximum size.

Modifier 2: Adjusts the rate (frequency) of the ripple from 0 = no adjustment to 255 (100%) = maximum rate

Modifier 3: Adjusts the offset (phase) speed and direction. A DMX value of 128 (50%) = no adjustment. DMX Values above the midpoint increase speed in a forward direction to 255 (100%) = fastest speed. DMX values below the midpoint increase speed in a backward direction from no adjustment to 0 = fastest speed.

Tiling

☑ Object Effect ☐ Global Effect

Effect Mode parameter DMX value = 48

Tiling varies the number of times a media file is applied as a texture to an object. This effect works best on objects that have an undisrupted surface area.

Modifier 1: Adjusts the size and number of tiles along the x axis. A value of 128 (50%) = no adjustment. Values below the midpoint size a single image to 0 = maximum image magnification. Values above the midpoint increase number of images displayed to 255 (100%) = maximum.

Modifier 2: Adjusts the size and number of tiles along the x axis. A value of 128 (50%) = no adjustment. Values below the midpoint size a single image to 0 = maximum image magnification. Values above the midpoint increase number of images displayed to 255 (100%) = maximum.

Modifier 3: Not Used

NOTE: The Tiling effect implemented on Effect 1 overrides tiling on Effect 2.

Transparent Wipes

☑ Object Effect ☑ Global Effect

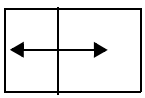
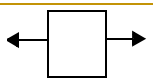
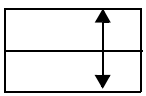
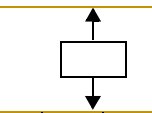
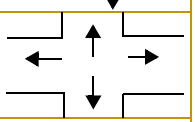
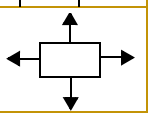
Effect Mode parameter DMX value = 33

Transparent wipes let you open one graphic to reveal another graphic behind it. You can select from six options and the centerline of the effect.

Modifier 1: Adjusts the area of the wipe from the smallest at a value of 0 to the largest at a value of 255 (100%).

Modifier 2: Selects the center of a wipe effect's separation

Modifier 3: Selects the wipe option. Each option occupies a portion of the DMX value range (see table).

DMX Value	Modifier 3: Wipe Option	
1-42	Rectangle wipes from center out horizontally	
43-84	Rectangle wipes from edges out horizontally	
85-126	Wipes from center out vertically	
127-170	Wipes from edges out vertically	
171-212	Cross shape wipes from center out	
212-255	Box shape wipes from edges outward	

Zoom Blur

☑ Object Effect ☑ Global Effect

Effect Mode parameter DMX value = 59

Zooms into a position on the image with a mult-image blurring effect. You can control the position of the zoom center on the image.

Modifier 1: The default DMX value of 128 (50%) = no adjustment. Values below the midpoint move the horizontal center of the zoom right to 0 = maximum. Values above the midpoint move the horizontal center of the zoom left to a maximum at a value of 255 (100%)

Modifier 2: The default DMX value of 128 (50%) = no adjustment. Values below the midpoint move the vertical center of the zoom down as you approach 0 = maximum. Values above the midpoint move the vertical center of the zoom up to a maximum. at a value of 255 (100%)

Modifier 3: The default DMX value of 128 (50%) = no adjustment. Values below the midpoint zoom in to the zoom centerpoint as you approach 0 = maximum image size. Values above the midpoint zoom out from the zoom centerpoint to a minimum image size at a value of 255 (100%)

NOTE: This option is also available as a Visual Mode adjusted with 2 Modifier parameters, (see **Zoom Blur** *on page 77).*

Chapter 13:

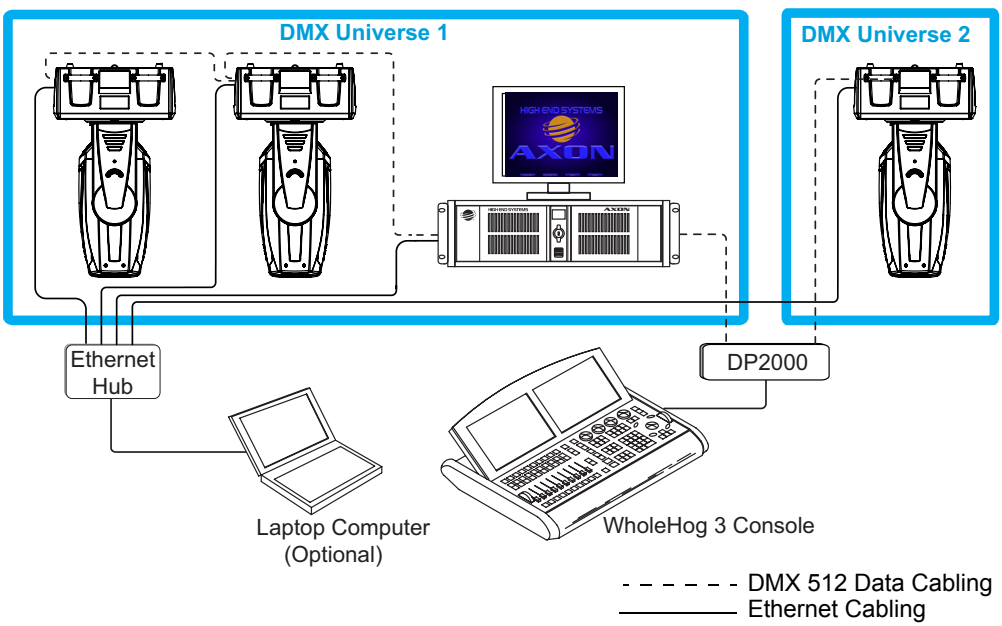
Content Management Application (CMA)

A Content Management Application (CMA) running on an Axon media server or a computer connected through an Ethernet network gives you remote control of content, software and configuration management functions.

The Content Management Application software that shipped on CD with your Axon Media Server communicates is used to:

- Upload and download custom digital content to fixtures
- Configure units for use in a DMX environment
- Update software for multiple units

Both DL.2 fixtures and Axon media servers can be accessed remotely by the CMA if they are connected to the same Ethernet network.



NOTE: If you are using a DMX console and other automated lighting products compatible with Art-Net, this network can also serve as the link for DMX control.

Launching the CMA

Installing the CMA on Your Computer

The CMA can be easily installed on a computer connected through an Ethernet network to remotely manage content, software and configuration of multiple media servers.

You can download the latest version of the application for Windows XP or Mac OS 10.4 based system from the Digital Lighting support section of the High End Systems website www.highend.com/support/digital_lighting/. A download wizard simplifies installation on your personal computer. The following are recommended hardware requirements for the CMA:

The following are recommended software requirements for running the CMA:

- Windows XP or Mac OS 10.4 or later
- Microsoft .Net 2.0 and 1.1 with Service Pack 2 installed
- 100/1000 base Ethernet card (a Gigabit Ethernet card is recommended for fast content uploading of large files)

NOTE: ***When installing the CMA on a laptop, disable the wireless adapter to prevent IP address conflicts that can keep the CMA from recognizing DL.2 or Axon units.***

To automatically install the CMA on your computer's harddrive, insert the CD that shipped with your media server.

NOTE: ***If you are running Windows OS and the CMA doesn't automatically install, navigate to the*** **CMA.msi** ***file in your windows browser and double click to install the CMA.***

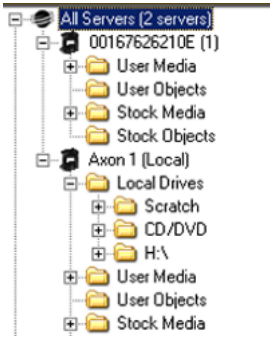
Once the CMA is installed, double clicking on the application icon will launch it and display the Client management window.

Launching the CMA on Axon

Axon media servers can launch the CMA locally. When you start Axon, the local monitor will display a desktop that gives you access to the CMA.

NOTE: ***An active display device must be attached to both DVI ports before booting up the system. When only one port is connected, it defaults to display the graphics engine output and will not display the CMA screen.***

Press the **Launch CMA** button on the local desktop. The application automatically finds and identifies the **Local Drives** including any connected USB drives, the CD/DVD drive as well as other Axon and DL.2 media servers connected to the same Ethernet network.



NOTE: ***The Axon Server supports an onboard DVD drive you can use for copying content into an Axon Server as well as burning User content onto DVD/CD.***

Auto Discovery

When a DL.2 fixture or Axon media server is connected to a network, it sends out "Discovery" messages. These messages are received by other servers on the link as well as the CMA software. The messages contain information that allows the media servers to communicate with each other, and the CMA to communicate with all the units on the network. This

information includes the IP Address, Fixture ID, and the media server software version. Fixtures derive their IP addresses through a router or automatic IP assignment.

Fixture Identification

The Fixture ID is used in the control protocol to identify specific fixtures for sychronization functions. For more information on Sychronization content playback, see *Chapter 9: Graphic Functions: Synchronizing Content* on page 83.

NOTE: To ensure that sychronization works properly, each DL.2 fixture or Axon media server should be assigned a unique fixture ID.

The Management Client Window

The CMA application's Management Client Window uses a simplified Windows Explorer style user interface with views of the content and configuration of all DL.2 and Axon servers connected to the Ethernet network. You can access options for each view from the drop down menu at the top of the Management Client Window or with a right-click in the right pane.

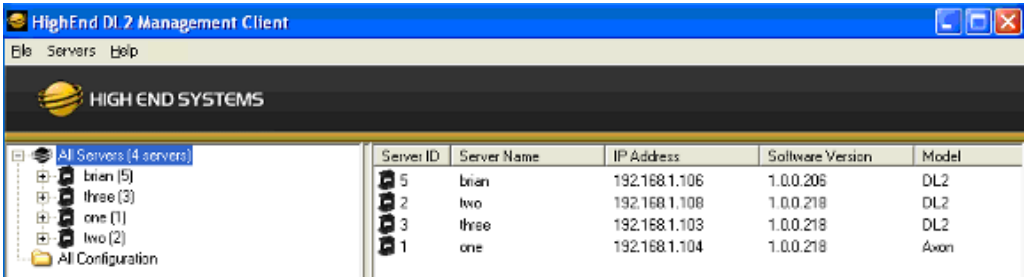
NOTE: You cannot drag folders or files between the left and right panes of the CMA window.

A **Status Bar** at the bottom of the page, indicates the number of files or folders within a selected folder in the left pane, as well as free space on the local computer harddrive and it's IP address.

Viewing Server Identification Information

Selecting the **All Server** view displays all the DL.2 and Axon servers on the fixture network. In the following example, four servers have been identified on the network. The right pane contains the following details in a table format.

- **Server ID** number defaults to 1, but can be configured in the CMA or in the DL.2 fixture's Menu system
- **Server Name** is a name you assign to a DL.2 fixture or Axon server
- **IP Address** is assigned to that unit by the router or Auto IP
- **Software Version** Number
- **Model** identifies the media server as either DL.2 or Axon



NOTE: Clicking in a column heading sorts the table according to the values in that column.

In the **All Server** view, the drop down menu or a right click on a server in the right pane gives you the these options:

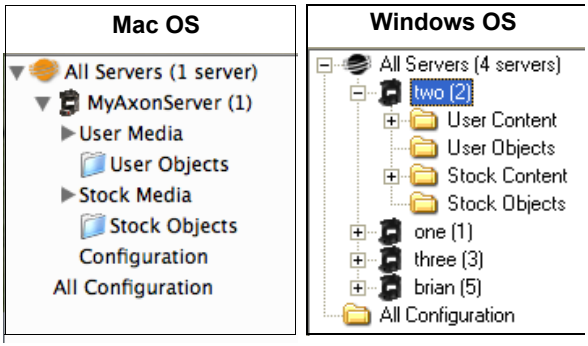
- **Refresh** the screen
- **Clone Content** replicates the server's user content to one or more other servers on the network, *(see page 171).*
- **Delete Content** removes all the user content from the server.
- **Create Content Archive** lets you back up all the server's user content to a compressed file, *(see page 170).*
- **Deploy Content Archive** restores user content to the server from the backup, *(see page 170).*
- **Upgrade Software** allows you to upgrade fixture software. For more information on upgrade options, see *Upgrading Software* on page 172.

Client Window Content Organization

The media server on each fixture has a file system that holds the movies, images, and 3-D objects that make up the content that the server uses.

These files, folders, and their DMX values are collectively known as the "Content" on the media server.

The Client Management Window organizes and identifies content by source (preloaded Stock content or custom User content) and type (Media files or 3D Object files).



NOTE: ***Tree structure differs slightly on the two platform versions. In the Mac version, to access Server Configuration information for an individual server, select the Configuration option under the individual server. In Windows Explorer, configuration information for the server is located directly by selecting the server.***

Preloaded Stock Content

A large library of Stock Media and Stock Objects ships on every DL.2 or Axon media server and will also be provided through upgrades from High End Systems. This content is read-only.
You won't be able to download, edit the DMX values or remove these files from the fixture.

Custom User Content

You can create your own custom User Media and User Objects content, and upload it to media servers. The Stock Content and User Content reside in separate folders. The High End Systems Digital Lighting Community (**forums.highend.com**) is a resource for tips and techniques on creating User Content. See *Custom User Content* on page 247 for basic considerations in developing your own content for the Axon or DL.2 media server.

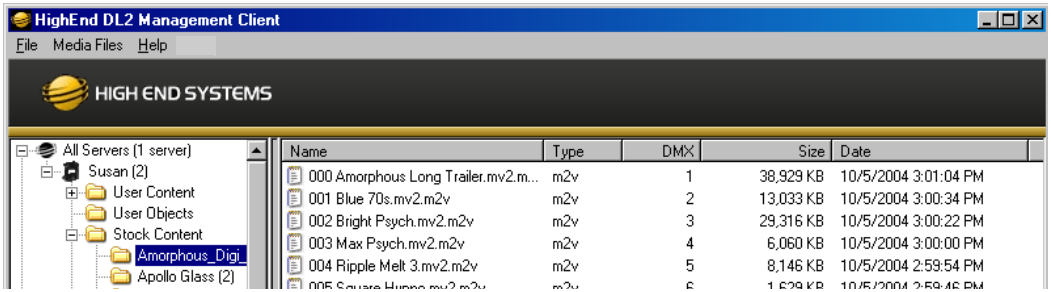
Media Files

Inside User Image and Stock Image folders are Library folders containing collections of media files. Media files can be still images or video clips in one of the following formats:

.jpg	.gif	.png	.bmp	.mpv	.m1v	.mpg	.m2v

NOTE: Axon and DL.2 media servers supports .jpg formatted using RGB color. CMYK color files are not currently supported.

The stock media files provided by High End Systems have been compressed and optimized for reliable and smooth playback from Axon and DL.2 media servers. Each file and folder has an associated DMX value. These values are fixed for Stock Content but must be assigned for all user created content. See the *Assigning DMX Values to User Content* on page 165 for more information.



3D Object Files

Object files are the 3-D object component files used to build a graphic image. DL.2 and Axon protocol supports a combined total of 255 object files displayed in Stock Objects and User Objects folders. As with Stock Media files, the Stock Objects have a fixed DMX value and cannot be edited. A User created object file must be assigned a unique DMX value between 150-255.

Viewing Server Configuration Data

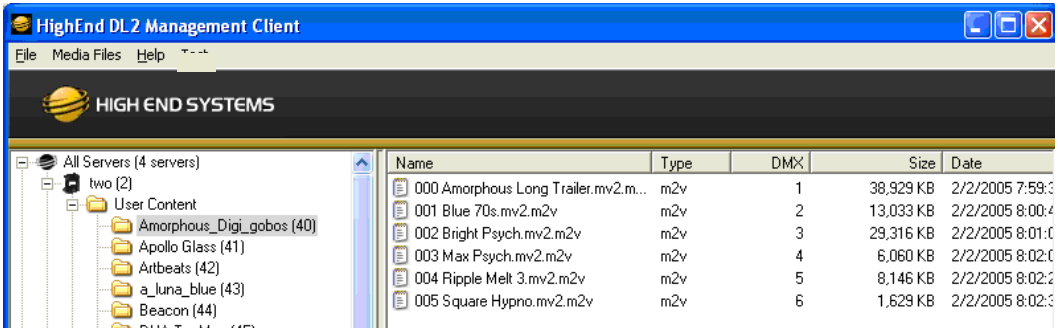
Selecting an individual server from the list in the left pane displays all the configuration values for that server in the right pane. Selecting **All Configuration** displays the combined configuration values for all the servers on the network. For more information on server configuration, see *Viewing and Editing Server Configuration* on page 174.

Mac OS X: Viewing Server Configuration

To access Server Configuration information for an individual server, select the Configuration option under the individual server.

Viewing Content

When viewing Content, the right pane contains the following information in a table format.



NOTE: Clicking on a column heading sorts the table according to the values in that column.

Viewing Folders

Each Stock or User Media folder contains a group of media files.

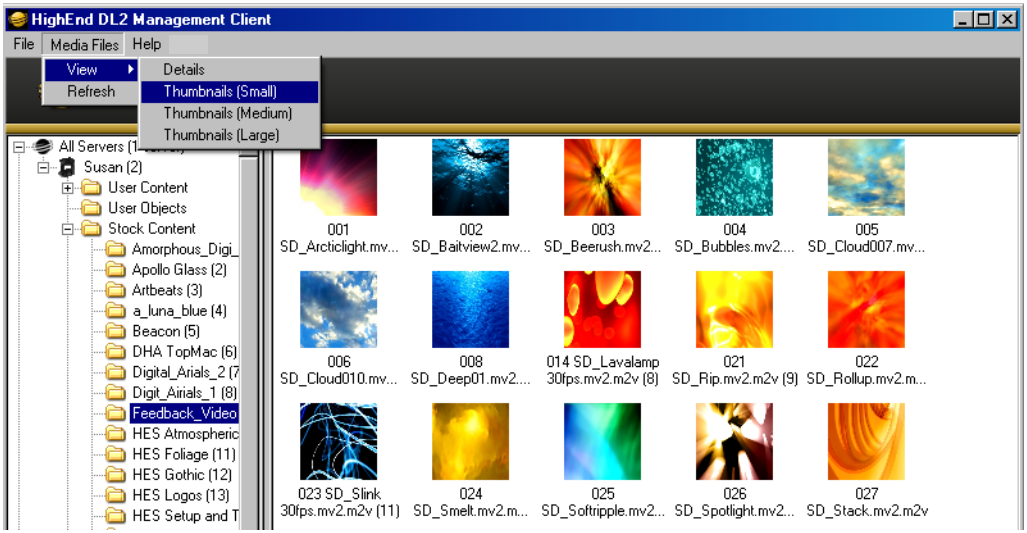
- **Name** of the Media File collection. This value is editable for User content. See *Naming and Deleting User Content Files and Folders* on page 164.
- **DMX** is the currently assigned DMX value for the folder. This value can be auto-assigned and edited for User content. See *Editing User Content DMX Values* on page 165.
- **File Count** of files in this collection
- **Date** the folder was last modified

Viewing Files

Selecting the actual media folder reveals its contents.

- **Name** of the file. This value is editable for User content. See *Naming and Deleting User Content Files and Folders* on page 164.
- **Type** indicates the file format extension
- **DMX** is the currently assigned DMX value for the folder. This value can be auto-assigned and edited for User content. See *Assigning DMX Values to User Content* on page 165.
- **Size** of file in kilobytes
- **Date** the file was last modified.

You can access several options for displaying files in the right pane through the drop down menu or by right clicking in the right pane when files are being displayed.



Managing User Content

All Stock and User content can be viewed and refreshed but the CMA client gives you additional control over other aspects of your custom content. Within the CMA window,
you can:

- Rename user files and folders
- Delete files and folders
- Control DMX value assignment to files and folders
- Move files and folders between your local drive and a media server.

Naming and Deleting User Content Files and Folders

You can **Rename** any user content folder or file displayed in the right pane of the CMA window using the pull down **Media Folders** or **3D Objects** menu or with a right click selection. Use the standard Windows operating system naming conventions.

You can **Delete** any user content folder or file displayed in the right pane of the CMA window using the pull down **Media Folders** or **3D Objects** menu or with a right click selection.

NOTE: You cannot Delete a movie if the media server is playing it.

Assigning DMX Values to User Content

The DMX Value associated with each file and folder makes it easy to use the DMX control protocol to identify a unique media file or 3D object.

There are up to 240 Media file folders with each capable of containing up to 255 image or movie media files. This gives a theoretical total of 61,200 possible locations for Media image or movie files. There is one DMX parameter used to identify a 3D object so 255 DMX values are available between the Stock and User Content to identify 3D objects.

Assigning DMX Values Automatically

The CMA can automatically assign a unique DMX value to any file or folder on a media that does not already have a value. This automated assignment is based on alphabetically sorting the existing file/folder names, and assigning each item a unique consecutive integer.

To automatically assign DMX values to a single file or folder with user content:

1. Display the User content folder or file in the right pane of the CMA Window
2. Select **AutoSet DMX** from either the **Media Files** folder or **3D Objects** drop down menu or the right click popup list. The CMA will assign a valid DMX value to the file or the folder.

You can automatically assign DMX values to all folders at once or to all the files within a folder at once. You cannot set both files and folder values at the same time. To automatically assign DMX values to all the User content folders or all files within a User content folder:

1. Display the User content folders or the files for a single folder in the right pane of the Content Management window and deselect all files or folders.
2. Select **Autoset All DMX** from either the **Media Folders** or **3D Objects** drop down menu or the right click popup list. The CMA will assign a valid DMX value to all selected files or folders.

Using the same steps, you can also **Reset DMX** for a single file or folder or **Reset All DMX** for all display files or folders displayed in the right pane to zero.

Editing User Content DMX Values

You can manually assign any valid DMX value to your files or folders by selecting the file or folder in the right pane and then, using the pull down menu or the right click popup, selecting **Edit DMX**. A dialog box will allow you to input the DMX value. If it is a valid value from 0-255, the CMA will change the DMX value displayed for the file or folder.

Valid DMX Values

Certain DMX values are **Reserved** for special purposes and are not user assignable. You can change the assigned DMX value for a User Content item to another valid DMX value. A valid DMX value is:

- From 0-255
- Is not one of the reserved values for that type of content
- Is unique from other content of it's type except for zero

The following table shows valid and reserved values for User Content.

Content Type	DMX Values	Description	Reserved?
Media Folders (media file collections)	0	No Selection	No
	1-40	Default Stock media	Yes
	41-239	User collections	No
	240-254	Reserved	Yes
	255	Internal Camera video feed	Yes
Media Files	0	No Selection	No
	1-255	Media files	No
Objects	0	No selection	No
	1-149	Stock 3D Objects	Yes
	150-255	User 3D Objects	No

Moving User Content Files and Folders

User content can be easily moved between fixtures and your local drive as well as between fixtures. Which method you use depends on:

- How much content you want to move
- What existing server content you want to preserve
- Whether the client machine is currently connected to the Ethernet fixture link
- If you want to maintain currently assigned content identification DMX values
- Which CMA version you are using (Windows or Mac OS)

There are several methods for moving User content files and media folders between media servers to your local drive:

- Drag and Drop
- Copy and Paste commands
- Cloning transfers the User Content files and their DMX value assignments from one media server to one or more server(s) on the fixture network.
- Creating a Content Archive
- Deploying a Content Archive

Use the following table to determine the best method for your situation.

Fixture Network File-Transfer Method	Transfer Type			Notes
	From Server to Client Machine	From Client Machine to Server(s)	Between Networked Server(s)	
Drag and Drop	Yes	Yes, if format is valid for destination folder	No	Does NOT preserve DMX Values
Copy and Paste commands	Yes	Yes	No	
Clone	No	No	Yes	Preserves DMX values and Replaces any previous User Content on destination drive
Deploying a Content Archive	No	Yes	No	
Creating a Content Archive	Yes	No	No	Saves assigned DMX values when creating archive from content on a fixture

Downloading Content from a Media Server to Your Local Drive

The CMA supports downloading User content files or folders from a media server to your local drive. To download a file or folder of User Content:

1. Display the Folder or File that you wish to move in the right pane of the CMA window
2. If the destination for the file on your local drive is visible, you can simply drag and drop the folder or file to that location or an external drive connected to your computer.

   OR
3. Select **Copy** from the **Media Files** or **3D Objects** drop down menu or the right click popup list.
4. Browse to the destination on your hard drive; then select **Paste** from the **Media Files** or **3D Objects** drop down menu or the right click popup list.

Mac OS X: Downloading files

You can drag single or multiple files and folders from a fixture to the Finder.

You can use the copy/paste (Apple-C, Apple-V) to move multiple files from a fixture to the Finder.

Mac OS X: File transfer

SMB limitation is 4GB file size per transfer. What this means is more than 4GB of data may be transferred, but no file can be greater than 4GB in size.

Uploading Content from Your Local Drive to a Media Server

You can upload User Content Media files, Media folders and 3D object files from your hard drive to an Axon or DL.2 media server, provided they are:

- A valid file format (.jpg, .gif, .png, .bmp, .avi, .mpg, .m2v for Media Files; .x for 3D Object files)
- You are uploading them to the appropriate User content folder on the media server

To upload content:

1. Display the file or folder destination in the right pane of the CMA window
2. Browse to the file or folder you want to upload on your hard drive and click on it to select.
3. Drag and drop it into the appropriate User content folder

   OR
4. Select **Copy** from the **Edit** drop down menu or the right click popup list.
5. Select **Paste** from the **Media Files** or **3D Objects** drop down menu or the right click popup list.

As files are uploaded to fixtures, the User interface displays progress information and notifies the user of any naming conflicts when files are renamed.

A newly uploaded file or folder will have a default DMX value of zero. If a naming conflict occurs, you will be prompted before overwriting the file.

Mac OS X: File transfer

SMB limitation is 4GB file size per transfer. What this means is more than 4GB of data may be transferred, but no file can be greater than 4GB in size.

Moving Files Between Fixtures

The CMA can transfer both individual files or entire folders between fixtures. The DMX values assigned to the files are transferred along with the files themselves. You can also simultaneously transfer files from one fixture to a group of fixtures.

Archiving User Content

An Archive/Image is a compressed file used to store media files, folders and object files along with valid identification DMX values. This Content Archive is used to backup User Content that can be restored to any media server.

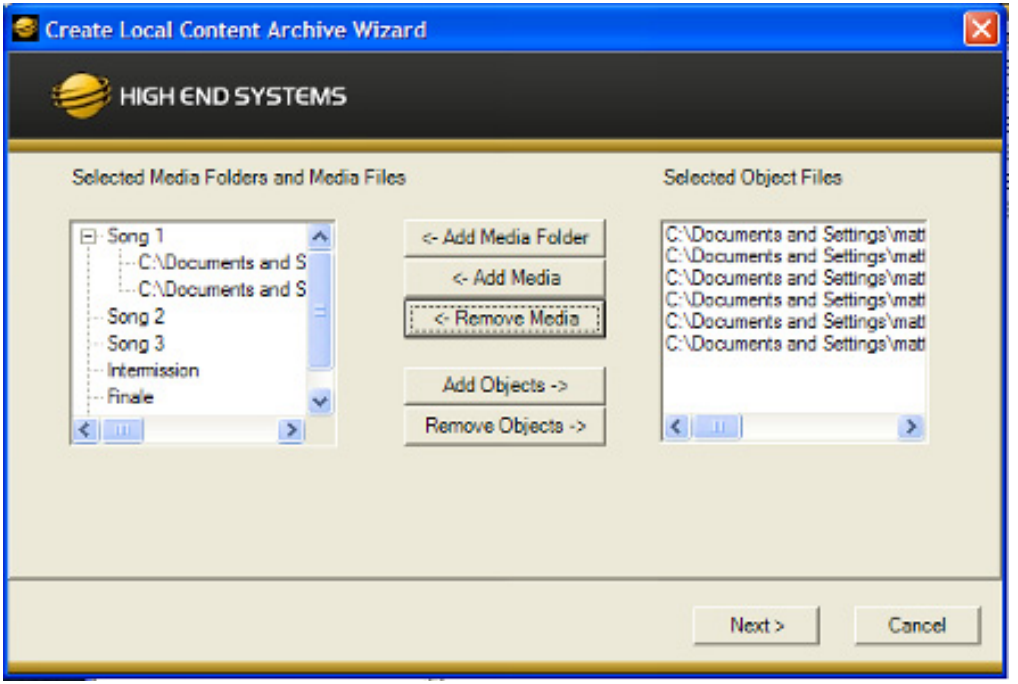
Using Local Archives to Prepare Content Offline

You can create a Local Archive of files stored on your harddrive to be deployed to a server at another time. This lets you work on organizing files for a specific show offline and then upload it to a server at a later date.

Creating a Local Archive

For CMA Running Windows XP

1. Under the FILE menu, select **Create Local Archive** to launch the archiving wizard.



2. Click on **Add Media Folder.** This will add a media folder to the left-hand column named "MyMedia0". Each successive media folder will be named "MyMedia1, MyMedia2, and so forth. You can rename these folders by single clicking on the name of the folder
3. After creating a folder and renaming it (if you wish), highlight the folder to add media files.
4. Click **Add Media**. This will bring up a file browser window that will allow you to navigate to the spot on your hard drive containing the media you want to add. You can add single files or multiple files. To add multiple files, hold down shift and select multiple media files with your mouse.

5. Click **Add Objects** if you wish to add custom 3-D objects to the archive. This will again bring up a file browser window to navigate to you 3-D objects. Any 3-D objects added will appear in the right hand column of the wizard. 3-D objects do not get added to folders.
6. Click **Next** at the bottom of the wizard. This will take you to another screen where you choose where to save and what to name your archive.
7. Click **Browse** to navigate to where you want to save and name your archive.
8. Click **Next.** Your archive will then be created.

NOTES: The Remove Media and Remove Object buttons can be used to remove media files and objects from the wizard when creating the archive.

Currently, the archive will not be created unless each media folder created has at least one media file in it.

All media folders, files and objects will be assigned DMX addresses in alphabetical fashion.

For CMA Running Mac OS 10.4

To create a Local Archive, you must first create the folder structure recognized by the CMA. The Creative Local Archive compresses these files into a .dlc format that can be recognized for uploading. Use the following folder structure in preparing files for a local Archive:

- A top level folder, which contains a Media and Objects folder.
- The Media folder must contain subfolders, and valid files may go into those subfolders.
- Only objects with a .x extension are allowed in the Objects folder (no subfolders).

Creating Content Backup Archive

Backups are created using the Content Archive feature. An Content Archive file is a compressed file containing all the User Content from a single fixture along with the assigned DMX values for folders and files.

To create a Content Archive

1. In the Management Client Window select **All Server** in the left pane.
2. Select the Server with the content you want to backup in the right pane.
3. Select **Create Content Archive** from the **Media Files** or **3D Objects** drop down menu or the right click popup list.

Deploying a Content Archive

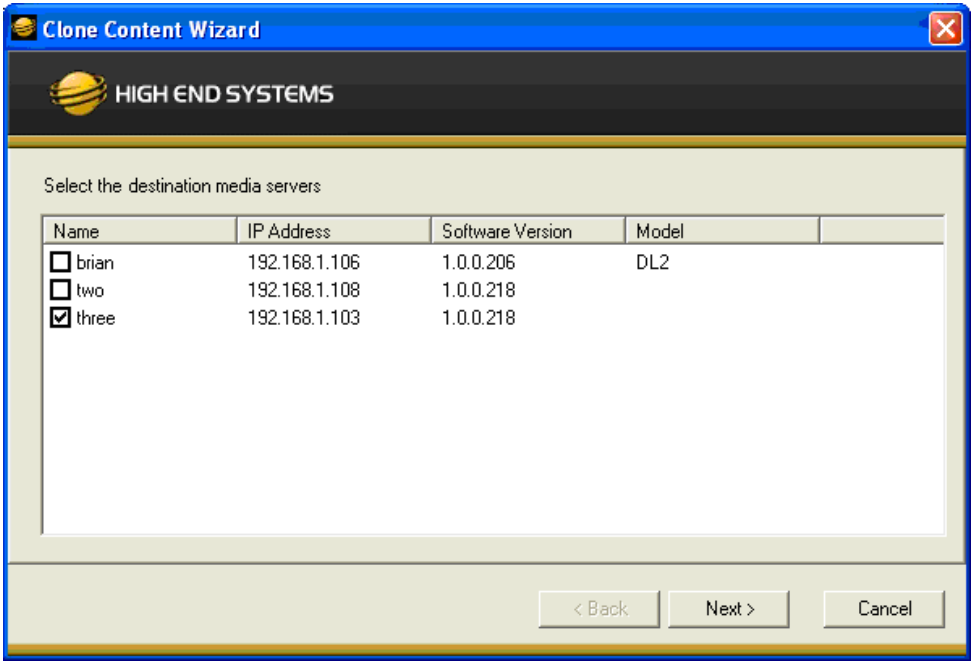
Deploying the Content Archive you created restores the user content to a fixture. To replicate this content to other fixtures on the link, use the Clone Content feature (see *Cloning User Content* on page 171).

Cloning User Content

Cloning is a file transfer operation where all the User Content of a single fixture is replicated across one or more other fixtures. Cloning preserves all user content naming and DMX values. This allows you, for example, to send the custom content for a specific show to all the fixtures used in that show with one operation.

To clone user content:

1. In the Management Client Window select **All Server** in the left pane.
2. Select the Server with the content you want to clone in the right pane.
3. Select **Clone Content** from the **Media Files** or **3D Objects** drop down menu or the right click popup list. A Clone Content Wizard lets you select one or more servers on the fixture network as the destination for the cloned content.

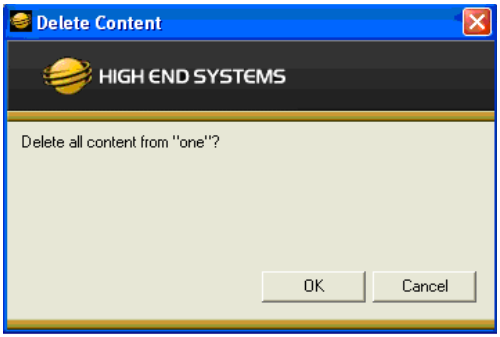


The cloning process erases all destination server(s) user content and replaces it with the selected server's user content. Stock content is unaffected.

Deleting Content

To delete ***all*** User Content from a server:

1. In the Management Client Window select **All Server** in the left pane.
2. Select the Server with the content you want to delete in the right pane.
3. From the drop down menu or the right-click popup list, select **Delete Content.** A dialog box OKs/cancels the action.



DMX Summary

The DMX Summary lets you view all the content for a single server in a table format with the following details:

- Whether the content is a **User** Media file/folder, a **Stock** Media file/folder, or a 3D **Object**
- The associated **Folder Name** for media files
- The **Folder DMX** value for media files
- The **File Name** for media or object files
- The **File DMX** value for media or object files

To view the DMX summary table:

1. Select **All Servers** from the left pane of the Management Client Window.
2. Select a Server in the right pane
3. Select DMX Summary from the drop down menu or the right-click popup list.
4. Press the **Create Table** button on the screen to build the summary table.

Upgrading Software

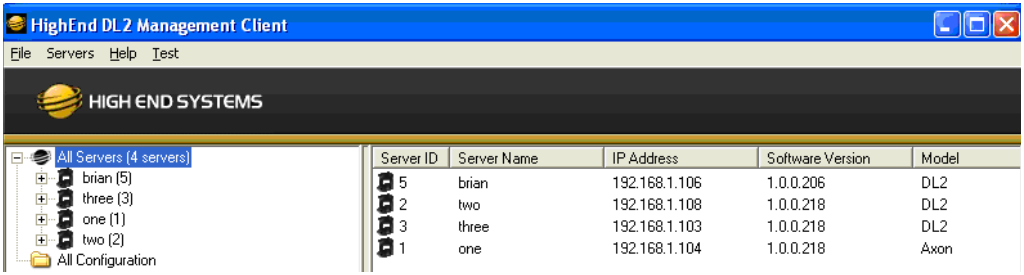
Upgrade Management allows the user to upgrade the media server application, Mac OS 10.4 or the XP Embedded operating system, and firmware on the system.

Verifying Software Versions

Running the latest version of both the CMA Client software and the media server software will ensure that you will get the best performance from the fixtures on your network.

To verify the CMA version, select **About** from the **Help** drop down menu. The media server software version is displayed for each server on the network in the All Servers view.

NOTE: Although running different versions of software on servers is not prohibited, it is highly recommended that all servers on the network be running the same software version.



Upgrading the CMA Software

Close the CMA before upgrading the CMA software. To Upgrade software:

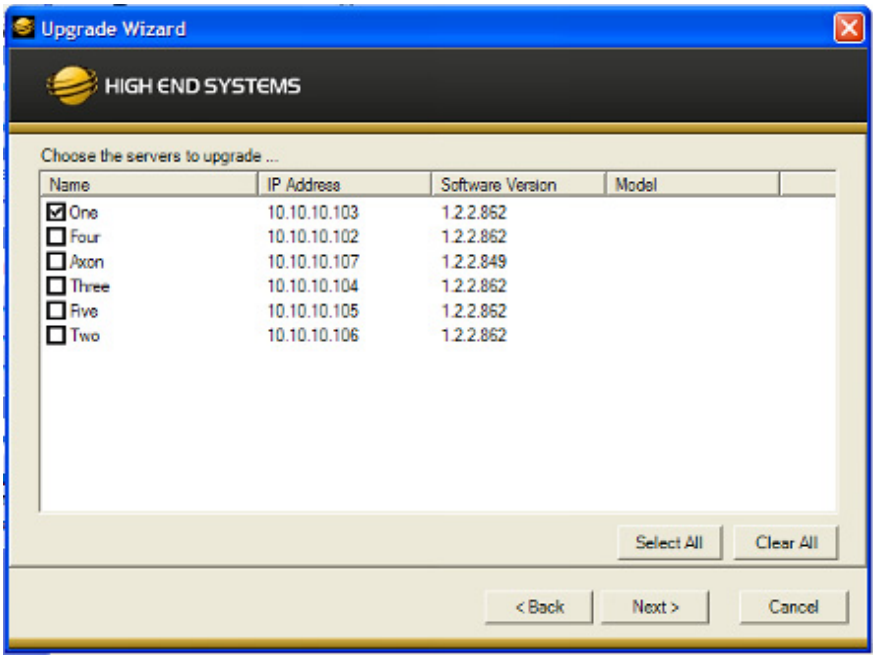
1. Download the latest version of the application from the Support section of the High End Systems website (www.highend.com). A download wizard simplifies installation on your personal computer.
2. A dialog box will give you the option to Run or Save the application. Pressing **Run** automatically un-installs any existing CMA version on your hard drive and installs the new version.

Upgrading Server Software

The server software for DL.2 and Axon media servers can only be uploaded to fixtures from the CMA. You must first save the latest version of the software from the High End Systems website (www.highend.com) to your hard drive and then use the CMA to upload it to any media server on your link. To Upgrade Server Software:

1. Using your internet browser, select the latest version from the support section of the High End Systems website. A dialog box will give you the option to Save.
2. Select the location and press Save again to put a copy of the Fixture software on your local drive.
3. Click on **All Servers** in the left pane of CMA Management window.
4. Right click anywhere in the CMA Window or use the Server's pull down menu to select **Upgrade Software**. The Upgrade Wizard will prompt you to browse to the location where you saved a copy of latest version.
5. After locating the upgrade file, press Next. The Upgrade Wizard displays a list of all servers connected to the fixture network.

6. Click in the box to the left of the server name to select a server(s) for upgrading.



7. Click **Next** to continue upgrade. The server will reboot after the upgrading the software.

Mac OS X: Upgrading Software

To upgrade multiple servers, select multiple fixtures from the* All Servers *list.

Viewing and Editing Server Configuration

The CMA lets you remotely view and modify fixture settings.

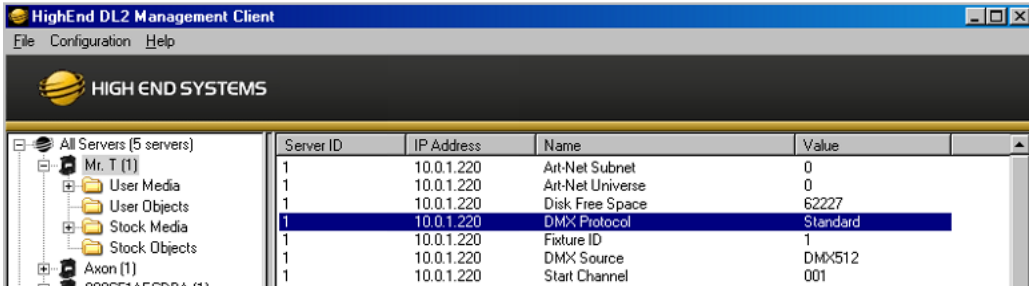
Some settings like Lamp Hours, CPU Temperature, Software Versions, etc. are view only. Other settings such as Fixture ID, various Projector settings, DMX Start Channel, etc. can be modified (configured).

All of these settings are also available for DL.2 fixtures through the onboard menu system. The CMA also has some additional configuration features that let you:

- Assign a name to servers connected over the network for easier identification of servers on your network.
- Compare all the Configuration Items of a certain type for a group of fixtures. For example, viewing the CPU Temperature for all the fixtures on a network.
- Control monitor display settings for Axon media servers.

Viewing Fixture Configuration Values

To view configuration information for a individual server, click on **All Servers** in the left pane of the CMA window and select the + to view all the servers on the fixture network. Select a server in the left pane to view its configuration information in the right pane.



Mac OS X: Viewing Server Configuration

To access Server Configuration information for an individual server, select the Configuration option under the individual server.

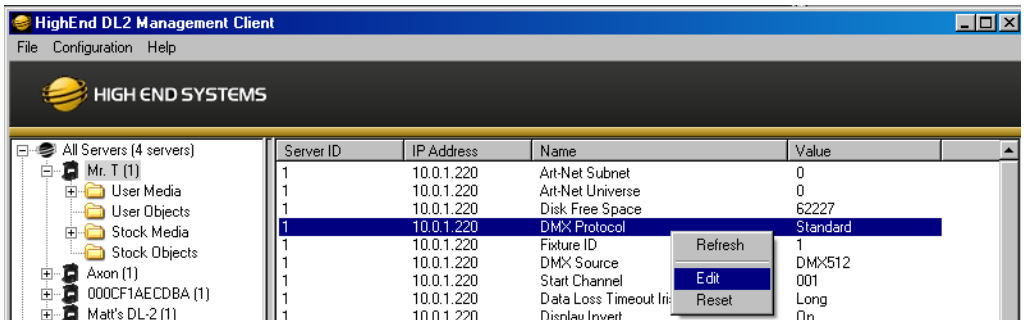
To view configuration information for all Servers on the network, select All Configurations in the left pane. The right pane now displays configuration values for all the media servers on the fixture link in a sortable table. Click in the column heading to sort by that column's values. A + symbol appears in the "sort by" column heading.

Editing Configuration Values

The Configuration table viewed in the right pane of the CMA window contains the following information for one or all servers:

- The server ID from 1-255
- The IP Address
- The configuration item name
- The current option setting

A right-click on a item will popup a list including Refresh, Edit or Reset. You can also double-click an item to bring up the edit dialog box. The Edit dialog box lets you choose between available options for that item.

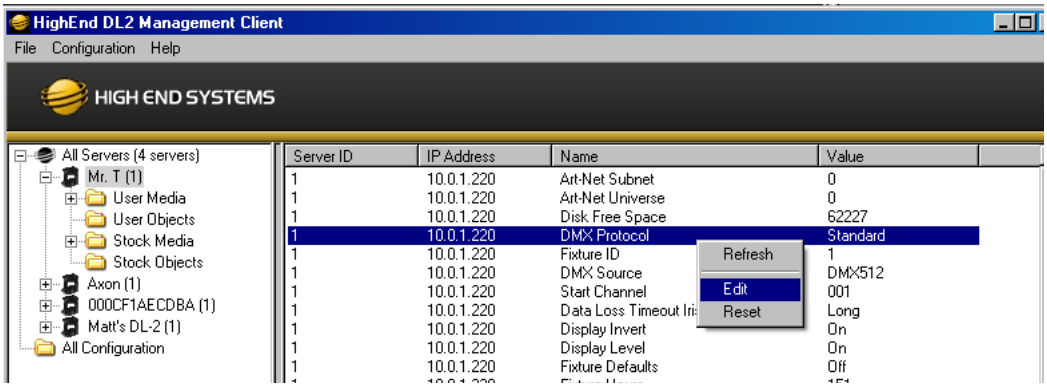


Configuration Example

Before programming a DL.2 fixture or the Axon media server from a DMX512 console, you need to:

- Identify the DMX Source for the fixture
- Select the Protocol type to determine the DMX channel range this fixture will utilize
- Select a Fixture Number to identify this Axon on the Ethernet link (required if you will be synchronizing output between fixtures).
- Assign a valid Start Channel (the first channel in the unique range of DMX channels designated by the console for this Axon)

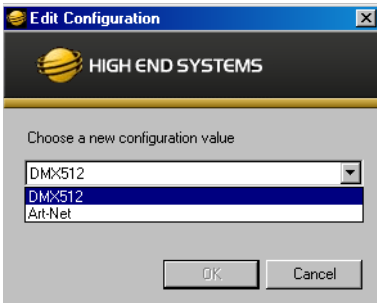
To view configuration information for a individual server, click on All Servers in the left pane of the CMA window and select the + to view all the servers on the fixture network. Select a server in the left pane to view its configuration information in the right pane.



To select a **DMX Source** type:

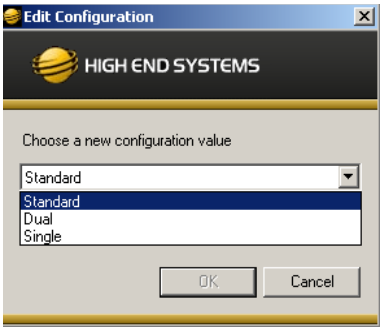
1. Scroll down the Configuration list in the right pane and double click on the line with DMX Source in the Name column to bring up the edit dialog box.

Choose between DMX512 and ArtNet as the source from the drop down list in the option field.



To select a **DMX Protocol** type:

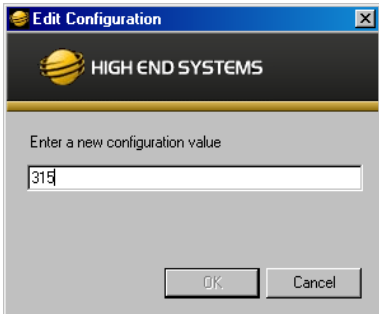
1. Scroll down the Configuration list in the right pane and double click on the line with DMX Protocol in the **Name** column to bring up the edit dialog box.
2. Choose **Standard**, **Dual**, or **Single** from the drop down list in the option field.



Protocol Selection	DMX Channel Range	
	Axon	DL.2
Standard Protocol	149	170
Dual Protocol	111	132
Single Protocol	73	94

To edit the DMX **Start Channel**:

1. Scroll down the Configuration list in the right pane and double click on the line with Start Channel in the Name column to bring up the edit dialog box.
2. Enter a valid Start Channel for the protocol type you have chosen. For more information on selecting a valid start channel, see *Determining a DMX Start Channel* on page 16.



Configuration Options

Available configuration values will depend on whether you're viewing an Axon or a DL.2 media server. The following table shows the configuration values available for viewing and/or editing.

NOTE: ***Read Only options are for information display only and cannot be edited. If you select or type in an option that is invalid, the OK button will be grayed out and not selectable.***

DL.2 Configuration Options

Configuration Item	Configuration Value Options
Art-Net Subnet	**0-16**
Art-Net Universe	**0-16**
Box Current Temperature	**Read only**
Box Maximum Temperature	**Read only**
Box Minimum Temperature	**Read only**
Box Temperature Reset	Pressing **Reset** restores value to Current Temperature
CPU Current Temperature	**Read only**
CPU Maximum Temperature	**Read only**
CPU Minimum Temperature	**Read only**
CPU Temperature Reset	Pressing **Reset** restores value to Current Temperature

Configuration Item	Configuration Value Options
Data Loss Timeout Iris	Closes iris when system stops receiving DMX data: **Long** = 5 minute delay **Short** = 5 second delay
Disk Free Space	**Read only**
Display Invert	**On** manually inverts display, **Off** reverts to default display orientation, **Auto** automatically inverts display when fixture is turned more than 90 degrees vertically.
Display Level	**Off** turns off display. Touching any button turns it back on. **Dim** lowers the brightness level **Bright** = full brightness level **Preview =** displays currently selected content
DMX Protocol	**Standard** = 170 channel footprint **Dual** = 132 channels **Single** = 94 channels
DMX Source	**DMX512** or **Art-Net**
Enable Focus Override	**On** selects manual focus **Off** resets to DMX control
Enable Zoom Override	**On** selects manual zoom **Off** resets to DMX control
Fixture Defaults	**On** restores fixture defaults **Off** displays whenever defaults has been changed
Fixture Hours	**Read only**
Fixture Hours Reset	Pressing **Reset** restores fixture hours to 0
Fixture ID	**1-255**
Fixture Name	Allows fixture name of up to 26 characters
Graphics Processor Current Temperature	**Read only**
Graphics Processor Maximum Temperature	**Read only**
Graphics Processor Minimum Temperature	**Read only**
Graphics Processor Temperature Reset	Pressing **Reset** restores value to Current Temperature
Head Current Temperature	**Read only**
Head Maximum Temperature	**Read only**
Head Minimum Temperature	**Read only**
Head Temperature Reset	Pressing **Reset** restores value to Current Temperature
Home Iris/Zoom/Focus	Press **Home** to start automatic mechanical reset for Iris, Zoom and Focus function
Home Motion	Press **Home** to start automatic mechanical reset for all motion functions.
Home Pan/Tilt	Press **Home** to start automatic mechanical reset for Pan and Tilt function
Lamp Hours	**Read Only**
Lamp Hours Reset	Pressing **Reset** restores Lamp hours to 0

Configuration Item	Configuration Value Options
Mainboard Current Temperature	**Read only**
Mainboard Maximum Temperature	**Read only**
Mainboard Minimum Temperature	**Read only**
Mainboard Temperature Reset	Pressing **Reset** restores value to Current Temperature
Model	**Read only**
Pan Invert	**On** Inverts pan positioning **Off** reverts to default position
Pan/Tilt Swap	**On** swaps pan and tilt positioning **Off** reverts to default positioning
Projector Control Menu	**On** access the Projector menu **Off** reverts to DL.2 menu
Projector Defaults	Selecting this option automatically restores projector defaults
Projector Focus Value	**0-255**
Projector Input	**External** accepts input from an external video source **Internal** accepts input from the graphics engine
Projector Input Selection by DMX	**Yes** allows projector input to be switched via DMX **No** disables projector input switching via DMX
Projector Startup Mode	**Always On**turns lamp on when the fixture is plugged in **Manual** turns lamp on only if the Lamp is set to **On** **DMX** turns lamp on if DMX is present
Projector Lamp On	**On** **Off**
Projector Zoom Value	**0-255**
Upgrade Content	Press **Upgrade** to upgrade stock content
Restore Settings	Press **Restore** to revert to factory fixture settings
Self Test Focus	**On** tests focus mechanical functionality **Off** stops self test
Self Test Iris	**On** tests Iris mechanical functionality **Off** stops self test
Self Test Pan/Tilt	**On** tests Pan and Tilt mechanical functionality **Off** stops self test
Self Test Video Pattern	Select from a list of Patterns to test graphics engine functionality
Self Test Zoom	**On** tests Zoom mechanical functionality **Off** stops self test
Reboot	Press **Reboot** to restart the internal graphics engine
Software Version	**Read only**
Start Channel	**0-255**
External SVideo Format	**NTSC_M** **NTSC_MJ** **PAL_B** **PAL_D** **PAL_G** **PAL_H** **PAL_I** **PAL_M** **PAL_N** **SECAM_B** **SECAM_D** **SECAM_G** **SECAM_H** **SECAM_K** **SECAM_K1** **SECAM_L** **SECAM_L1**
Tilt Invert	**On** Inverts Tilt positioning **Off** reverts to default position
Unique Number	**Read only**

Axon Configuration Options

Configuration Item	Configuration Value Options
Art-Net Subnet	**0-16**
Art-Net Universe	**0-16**
Disk Free Space	**Read only**
DMX Protocol	**Standard** = 149 channel footprint **Dual** = 111 channels **Single** = 73 channels
DMX Source	**DMX512** or **Art-Net**
DMX Start Channel	**0-255**
External SVideo Format	**NTSC_M** **NTSC_MJ** **PAL_B** **PAL_D** **PAL_G** **PAL_H** **PAL_I** **PAL_M** **PAL_N** **SECAM_B** **SECAM_D** **SECAM_G** **SECAM_H** **SECAM_K** **SECAM_K1** **SECAM_L** **SECAM_L1**
Firmware Version	**Read only**
Fixture ID	**1-255**
Fixture Name	Allows fixture name of up to 26 characters
Mainboard Current Temperature	**Read only**
Mainboard Maximum Temperature	**Read only**
Mainboard Minimum Temperature	**Read only**
Mainboard Temperature Reset	Pressing **Reset** restores value to Current Temperature
Model	**Read only**
Reboot	Press **Reboot** to restart the internal graphics engine
Upgrade Content	Press **Upgrade** to upgrade stock content
Restore Settings	Press **Restore** to revert to factory fixture settings
Self Test Video	
Self Test Video Pattern	Select from a list of Patterns to test graphics engine functionality
Software Version	**Read only**
Unique Number	**Read only**
Windows XPe Version	**Read only**
Primary Display Configuration	Select from a list of Screen Resolution/Refresh Rate/and Color Quality combinations for the Graphic Engine output.
Secondary Display Configuration	Select from a list of Screen Resolution/Refresh Rate/and Color Quality combinations for the local monitor output.
Display Rotation	Select from **0**, **90**, **180** and **270** degrees rotation of the Graphic Engine output.

Chapter 14:

Maintenance and Troubleshooting

This chapter includes information on maintaining filters, and some basic troubleshooting procedures.

WARNING:
This server must be serviced by qualified personnel. The information listed in this chapter is intended to assist qualified personnel *only*.

Maintaining the Filtering System

The Axon media server must be kept protected from excessive amounts of glycol fog, mineral oil, and smoke. You must follow these guidelines to ensure continued operation of the fixture:

- Air filters should be checked and cleaned on a regular basis. When used in a closed or fixed environment where fog or haze is used, we recommend at least a weekly check.
- Do not situate Axon in areas of high fog density such as directly in front of a fog machine or mineral oil hazer.
- Minimize the exposure of Axon to both glycol fog and mineral oil.

Cleaning and Replacing Filters

Axon has two filters located in the front of the chassis behind the blue cover plates. Check this filter often for dust or debris that can be caused when using the Axon in environments with confetti or pyrotechnics. ***This filter is washable with soap and water, but must be completely dry before re-installing***.

WARNINGS!
Disconnect power before servicing.

General Troubleshooting

The following table shows general troubleshooting suggestions:

Problem	Solution
Won't power on	• Verify fixture is plugged in to an appropriately-rated power source (power ratings are shown on *page 250*). • Check power cord wiring. • If the unit's previous shutdown was done remotely, you may have to manually turn on the power switch located behind the right front cover.
Powers on but no image	• Make sure a video output is physically attached to the Axon server, and that the video feed is active.
Powers on but does not display the CMA screen.	• An active display device must be attached to **both** DVI ports before booting up the system. When only one port is connected, it defaults to display the graphics engine output and will not display the CMA screen.
Fixture behaves erratically or won't respond to DMX control	• Verify that the last unit on the DMX link is properly terminated, (see *Setting up a Standard DMX Link* on page 8. • To control Axon with DMX, you must first enable DMX through the CMA (see *Viewing and Editing Server Configuration* on page 174.

LED Functionality

Four LEDs on the Front panel indicate the actions described in the following table.

The Red and Green LEDs are mirrored on the back panel.

Name	Color	State	Description
Status	Red	On	(45 sec On/1.4 sec.Off) Running normal motion-control code
		Fast Blink	Board communication activity; for example, during a software upload
		Slow Blink	320 processor card in the base housing is receiving code.
Drive	Amber	Blinking	Hard drive activity
DMX	Green	Fast Blink	Media Server is receiving DMX
Server	Blue	Steady	Media Server is receiving power

Restarting Axon

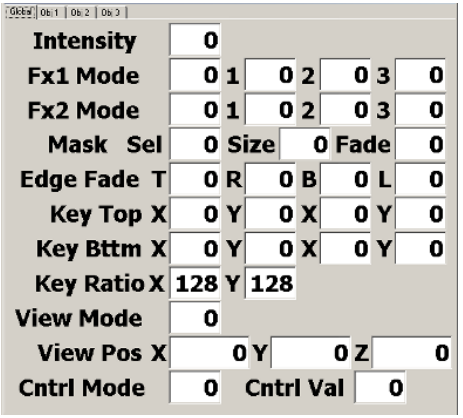
As with other computers not operating properly, restarting can often reestablish correct functioning. You can reboot Axon by:

- Clicking the Reset button on the Axon monitor desktop
- Pressing the manual reset button located inside the right front cover on the Axon chassis
- Disconnecting and reconnecting to power source

Protocol Viewer on Axon Desktop

To view the DMX settings currently selected for an Axon media server, you can access a Protocol Viewer by clicking the **Launch DMX View** button on the Axon Desktop.

The tabs at the top of the Protocol Viewer let you switch to Global, Graphic Object 1, Graphic Object 2, or Graphic Object 3 parameter settings.



Frequently Asked Questions

How are Axon IP addresses determined? In environments that utilize numerous Axon units, is there risk of IP address conflicts?

Axon IP addresses are determined one of two ways:

1. When using DHCP server (like router) IP is generated automatically
2. Without router IP is generated randomly by Windows called *Auto IP 169.254.x.x*

The generation of IP addresses is handled just as IP addresses are handled for Window networks

Is there a limit to the Ethernet cable run length from the fixtures to the CMA?

Ethernet Cat 5 limit is 100 meters. For longer distances use a router that takes fiber input to Cat 5 output as for typical Ethernet distribution.

What is the longest length High End Systems has tested for video distribution?

High End has tested up to 1000 feet of quality Cat 5 without noticing degradation of signal.

Does Axon support the file format "MPEG-4"?

MPEG-4 is not currently supported. Convert original graphics and video to MPEG 2.

Chapter 15:

Restoring the System

You can perform a system restore on the Axon or DL.2 Server with your System Restore CD.

A system restore will replace the following components:

- Microsoft Windows Embedded Operating System
- Application

The system restore does not replace the Settings, the Stock content, or User content.

Note: Because this method does not completely erase the hard drive, it also does not return the device to a factory state. To guarantee a complete return to a factory state, you must perform a full system restore.

Hardware Requirements

Caution: Contact High End Systems Support (http://www.highend.com) PRIOR to initiating a Full Restore!

A system restore can be done to replace the O/S partition of the drive, but should only be done as part of a specified upgrade plan. In that case, the XPe image the fixture shipped with will need to be updated.

All system restore operations require the System Restore CD that ships with each media server. If you have misplaced or damaged this CD, you may contact High End Systems (http://www.highend.com) for a replacement.

For a system restore, you will also need:

- External USB CD drive (for DL.2 fixtures only)
- USB keyboard
- Optional USB mouse, which may require the addition of a USB hub for DL.2 fixtures.

Performing the System Restore

Use the following steps to perform a system restore.

1. Plug your USB CD or DVD drive, keyboard, and mouse (optional) into one of the external USB ports on the media server. On DL.2 fixtures, you may need to use a USB hub, although this should only be a requirement if you wish to use a mouse.
2. Power on or reboot the media server. The System Restore menu will display on the Axon monitor or the Menu Screen on DL.2 fixtures.

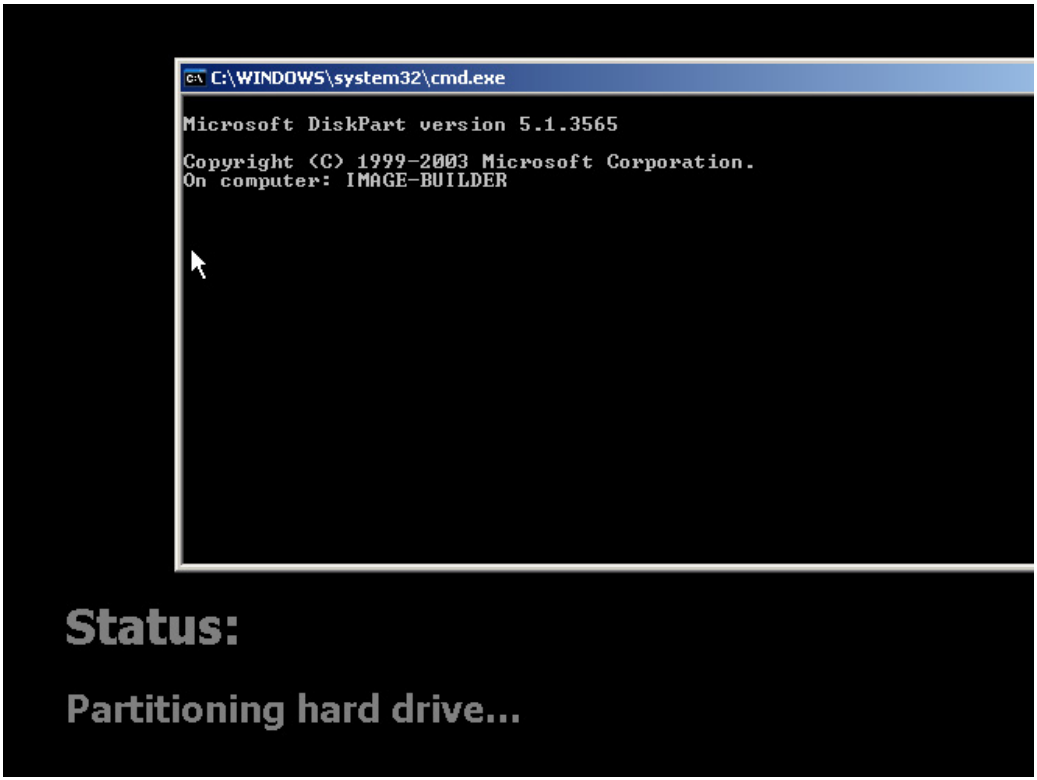
3. When the fixture boots and the High End Systems logo is seen, press F8 (Asus) or F10 (Intel) to enter the boot menu for the respective motherboard.
4. Select the appropriate boot device and when you see "Hit any key to boot from CD…", press a key on your keyboard.

   NOTE: Pressing* Tab *on the keyboard when booting the fixture displays the mother-board information.

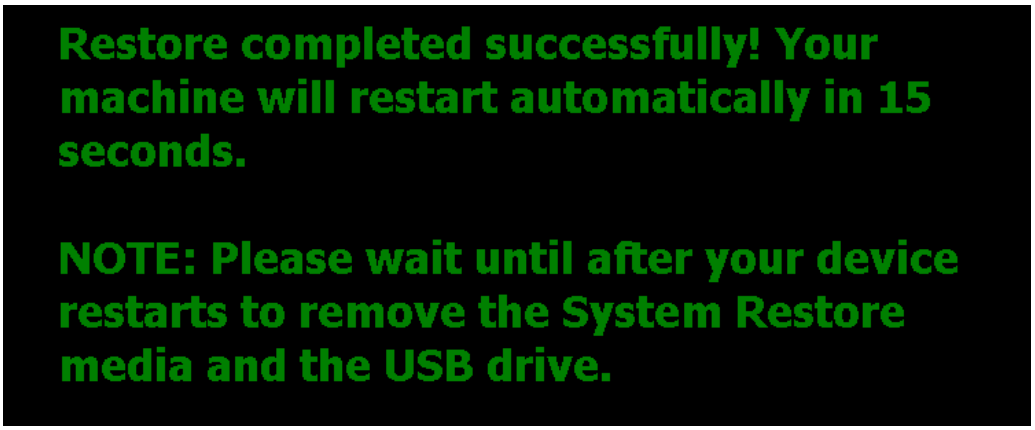
5. Allow the System Restore menu to load. Depending on the speed of your USB drive, it will take between 3-5 minutes load. During this time, a number of small windows will appear and disappear. Wait until you see a full-screen menu titled *Axon System Restore Menu* or *DL.2 System Restore Menu.*

6. Using the <Tab> key on your keyboard or using your mouse, select the system restore option or Exit to cancel the operation.
7. The next page will ask you to confirm your selection. Press 'Confirm' and the restore will begin.

8. Allow the restore to run. This will take between 10-30 minutes depending on the speed of your USB drive. Status will be displayed throughout the restore.

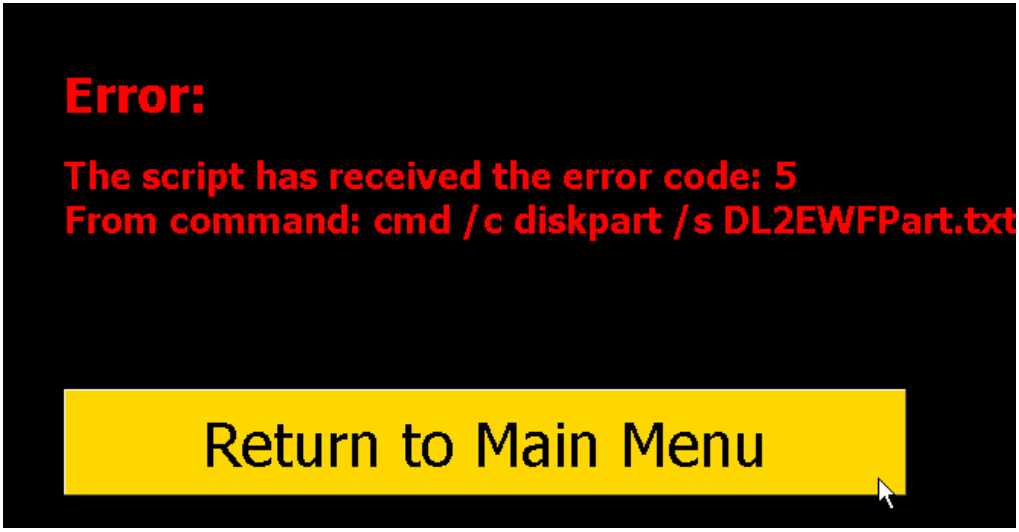


9. When this part of the restore is completed, the media server will automatically restart.



10. After allowing a few minutes for the media server to reconfigure, the upgrade is complete, you may remove all your external USB devices.

NOTE: If you encounter an error, press the Return to Main Menu button and start the recovery process again. An error on the second attempt may indicate a hard drive failure or damaged DVD. In that case, contact High End Systems Technical Support at www.highend.com..



Appendix A:

DL.2 and Axon DMX Protocol

DL.2 fixtures and Axon Media Servers utilize the same DMX protocol except that DL.2 fixtures include channels for motion and camera control. This table describes the Standard, Dual and Single Protocol for DL.2 fixtures and Axon Media Servers.

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
Motion and Camera Control (Standard, Dual, Single Protocol)							
Movement Functions (DL.2 fixtures only)							
1	NA	**Pan Course**	Moves projector head from 0° to 400°	0-65535	0-100	32768	50
2	NA	**Pan Fine**					
3	NA	**Tilt Course**	Moves projector head from 0° to 240°	0-65535	0-100	32768	50
4	NA	**Tilt Fine**					
5	NA	**Dimmer**	Adjusts the mechanical iris located in front of the projector output lens from closed to open	0-255	0-100	0	0
6	NA	**Focus**	Adjusts focus from near to far	0-255	0-100	128	50
7	NA	**Zoom**	Adjusts zoom from narrow to wide	0-255	0-100	128	50
8	NA	**MSpeed**	See Appendix B for conversion tables	0-255	0-100	0	0
9	NA	**Macro**	Reserved for future use	0-255	0-100	0	0
10	NA	**Control Function** *	***Fixture Movement and Camera Control Options (Set Dimmer Channel = 0 except for MSpeed Off)***		NA	0	0
			Pan and Tilt MSpeed off	10-13			
			Reserved	14-19			
			Menu Display Off (5)	20-28			
			Reserved	29			
			Menu Display Dim (5)	30-38			
			Reserved	39			
			Menu Display Bright (5)	40-48			
			Reserved	49			
			Preview	50-58			
			Reserved	59			
			Home All (20)	60-68			
			Reserved	69-79			
			Lamp ON (80)	80-88			
			Reserved	89			

* To prevent inadvertent triggering, some Control Function options won't activate until the value has been held for a period of time. A number in parenthesis is the minimum number of consecutive times a DMX value must be received from a controller before the operation begins.

Channel #		Function	Description		Value		Default	
DL.2	Axon				dec.	%	dec.	%
10	NA	**Control Function***	Lamp OFF (80)		90-98	NA	0	0
			Reserved		99-119			
			Shutdown (80)		120-130			
			Reserved		131-144			
			Graphics System Reset (80)		145-149			
			Camera Reset		150-155			
			Home Pan/Tilt (20)		160-168			
			Reserved		169			
			Home Focus/Zoom/Iris (20)		170-178			
			Reserved		179			
			Using the Projector's Menu System					
			Projector Menu		180-184	NA		
			Projector Up arrow		185-188			
			Projector Down arrow		189-192			
			Projector Left arrow		193-196			
			Projector Right arrow		197-200			
			Store menu selection		201-204			
			Projector Floor Orientation		205-208			
			Projector Ceiling Orientation	Active Commands	209-212			
			Projector Front Projection		213-216			
			Projector Rear Projection		217-220			
			Changing Projector Inputs (Set Dimmer Channel = 0)					
			External RGBHV to Projector		221-224	NA		
			Graphics Engine to Projector (default)		225-228			
			Changing Graphics Engine Inputs (Set Dimmer Channel = 0)					
			S-Video In to Graphic Engine, Internal Camera to Camera Out		229-232	NA		
			Internal Camera to Graphics Engine (default)		233-236			
			Reserved		237-255	93-100		

* To prevent inadvertent triggering, some Control Function options won't activate until the value has been held for a period of time. A number in parenthesis is the minimum number of consecutive times a DMX value must be received from a controller before the operation begins.

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
Internal Camera Functions (DL.2 fixtures only)							
11 12	NA	**Camera Zoom**	Zoom position	0-65535	0-100	32768	50
13	NA	**Camera Focus**	Focus position.	0-511	0-100	0	0
14			Manual Focus from In (Far End) to Out (Near End)	512-65535			
15	NA	**Infrared Illuminator**	Camera's IR sensing off, illuminator off	0-63	0-24	0	0
			Camera's IR sensing on, illuminator off	64-127	25-49		
			Camera's IR sensing on, illuminator scaled across the range from FULL to OFF	128-255	50-100		
16	NA	**Camera Shutter**	Auto Exposure = Full Auto	0-63	0-25	0	0
			Auto Exposure = Shutter Priority, Shutter Speed = 30	64-95	26-38		
			Auto Exposure = Shutter Priority, Shutter Speed =15	96-126	39-49		
			Auto Exposure = Shutter Priority, Shutter Speed = 8	127-157	50-62		
			Auto Exposure = Shutter Priority, Shutter Speed = 4	158-188	63-74		
			Auto Exposure = Shutter Priority, Shutter Speed = 2	189-219	75-86		
			Auto Exposure = Shutter Priority, Shutter Speed = 1	220-255	87-100		
17	NA	**White Balance Mode**	Auto Balance	0-63	0-25	0	0
			Indoor	64-95	26-38		
			Outdoor	96-127	39-49		
			Enable Manual Red and Blue gain value adjustment	128-191	50-74		
			Reserved - no change from previous state	192-255	75-100		
18	NA	**Camera Orientation**	Flip OFF, Mirror OFF	0-63	0-25	0	0
			Flip OFF, Mirror ON	64-127	26-50		
			Flip ON, Mirror OFF	128-191	51-75		
			Flip ON, MIrror ON	192-255	76-100		
19	NA	**Camera Effects**	Freeze Frame OFF, Negative Art, B&W OFF	0-63	0-25	0	0
			Freeze Frame ON, Negative Art, B&W OFF	64-127	26-49		
			Freeze Frame OFF, Negative Art, B&W ON	128-159	50-62		
			Freeze Frame ON, Negative Art, B&W ON	160-191	63-75		
			Freeze Frame OFF, B&W ON	192-223	76-88		
			Freeze Frame ON, B&W ON	224-255	89-100		
20	NA	**Red Gain**	Red gain adjustment (Requires White Balance Mode = 128-191)	0-255	0-100	0	0
21	NA	**Blue Gain**	Blue Gain adjustment (Requires White Balance Mode = 128-191)	0-255	0-100	0	0

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
Global Functions (Standard, Dual, Single Protocol)							
22	1	**Global Intensity**	Selects intensity level for the composite image	0-255	0-100	255	100
Global Effects							
23	2	**Global Effect 1**	Off, no effects selection	0	0	0	0
			CMY simulates CMY by subtracting RGB. Reduces color values. Mod1=cyan, Mod2=magenta, Mod3 =yellow	1	NA		
			CMY adds to all pixels. Increases color values. Mod1= cyan, Mod2=magenta, Mod3=yellow	2			
			CMY adds to non-black pixels. Increases color values. Mod1=cyan, Mod2=magenta, Mod3= yellow	3			
			RGB Add, all pixels. Mod1=red, Mod2=green, Mod3=blue	4			
			RGB Add 2, all pixels. Mod1=red, Mod2=green, Mod3=blue	5			
			RGB Add, non-black pixels. Mod1=red, Mod2=green, Mod3= blue	6			
			RGB Swap to GBR, Mod1=red, Mod2=green, Mod3=blue.	7			
			RGB Swap to BRG, Mod1= red Mod2 =green, Mod3= blue.	8			
			Solarize 1 If color value < DMX value, invert color. Mod1=red, Mod2= green, Mod3= blue.	9			
			Solarize 2 If color value > DMX, invert color. Mod1= red, Mod2=green, Mod3=blue.	10			
			Solarize 3 If color value < DMX, set color to 0. Mod1=red, Mod2=green, Mod3=blue.	11			
			Solarize 4 If color value > DMX, set color to 0. Mod1=red, Mod2= green, Mod3 -> blue.	12			
			DotP and Resample. Mod1, Mod2 and Mod3 control resampling.	13			
			Color Cycle, DMX value controls cycle speed. Mod1= red, Mod2 = green, Mod3 = blue.	14			
			All or nothing. Mod1=red, Mod2=green, Mod3=blue. If color value > mod value, color = 255, else color = 0	15			
			Solid color RGB, Mod1=red, Mod2=green, Mod3=blue.	16			
			RGB Invert Mod1 = red to inverted red, Mod2 = green to inverted green, Mod3 = blue to inverted blue	17			
			RGB Invert & Swap to GBR. Mod1 = red to inverted green, Mod2 = green to inverted blue, Mod3 = blue to inverted red	18			

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
23	2	**Global Effect 1**	RGB Invert & Swap to BRG. Mod1 = red to inverted blue, Mod2 = green to inverted red, Mod3 = blue to inverted green	19	NA	0	0
			Edge Detect Color. Mod1=horizontal size, Mod2 = vertical search size, Mod3=comparison threshold	20			
			Edge Detect B/W. Mod1=horizontal size, Mod2 = vertical search size, Mod3=comparison threshold	21			
			Texture Ripple, Horizontal Mod1=size, Mod2=rate, Mod3=offset	22			
			Texture Ripple, Vertical Mod1=size, Mod2=rate, Mod3=offset	23			
			Texture Ripple, Circular Mod1=size, Mod2=rate, Mod3=offset	24			
			Texture Ripple, Asymmetrical Circular Mod1=size, Mod2=rate, Mod3=offset	25			
			Chromakey Fine. Select key color using Mod1=red, Mod2 =green, Mod3 =blue	26			
			Chromakey Medium. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	27			
			Chromakey Coarse. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	28			
			Chromakey Inverse, Fine. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	29			
			Chromakey Inverse, Medium. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	30			
			Chromakey Inverse, Coarse. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	31			
			Scan Line. Mod1 selects scan line as texture, Mod2 fades from original image to converted image, Mod3 not used, reserved	32			
			Transparent wipes. Mod1 =width of transparent area, Mod2 =center of transparent area, Mod3=transparency mode	33			
			Pixel Twist. Mod1 = x twist center, Mod2 = y twist center, Mod3 =direction and amount of twist	34			
			Picture-in-Picture. Mod1 = x subpicture center, Mod2 = y subpicture center, Mod3 = subpicture size	35			
			Magnifying lens, Mod1 =x lens center, Mod2 =y lens center, Mod3 lens size	36			
			Magnifying lens 2, Mod1= x lens center, Mod2 = y lens center, Mod3 = lens size	37			
			Cartoon Edge. Mod1 = Edge Color, Mod2= Contrast, Mod3= Edge detection sensitivity	38			
			Color DeConverge Mod1= Moves red up, Mod2 = Moves green down and right, Mod3 = Moves blue down and left	39			
			Horizontal Mirror, Mod1 = mirror center, Mod2 and Mod3 not used	40			

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
23	2	**Global Effect 1**	RGB Swap to BGR Mod1 = red, Mod2 = green, Mod3 = blue	41	NA	0	0
			RGB Swap to RBG Mod1 = red, Mod2 = green, Mod3 = blue	42			
			RGB Swap to GRB Mod1 = red, Mod2 = green, Mod3 = blue	43			
			Colorize Gray Scale maps pixel intensity to color: Mod1 = Color Scheme selection, Mod2 = Zero intensity point in color scheme, Mod3 = Fading	44			
			Intensity key turns pixels of selected intensity transparent: Mod1= Color Scheme, Mod2= Intensity bandwidth, Mod3 = Transparency level	45			
			Raindrop effect. Mod1 = size/speed, Mod2=position, and Mod3 = raindrop rate.	46			
			RGB Scale. Mod1= scale red, Mod2=scale green, Mod3=scale blue. Maximum of Mod1, Mod2 and Mod3 sets overall color range	47			
			Reserved. Defaults to effect 0	48			
			Color to Alpha. Mod1 = red to alpha, Mod2 = green to alpha, Mod3 = blue to alpha	49			
			Color to Alpha, Inverted. Mod1 = inverted red to alpha, Mod2 = inverted green to alpha, Mod3 = inverted blue to alpha	50			
			Texture Mixing. Mod1= Source media file, Mod2= Source effect level, Mod3= Crossfade from original to source texture	51			
			Image Scale and Rotate. Mod1=scales image, Mod2= rotation angle, Mod3=rotation speed	52			
			Film Roll. Mod1=horizontal roll speed, Mod2=vertical roll speed, Mod3=Image scale	53			
			Pixelate. Mod1=Amount of pixelation, Mod2=horizontal scaler, Mod3=vertical scaler	54			
			Faux LED. Mod1 = ”LED” size, Mod2 = spacing, Mod 3 = color peaking	55			
			Faux Tile. Mod1 = Tile size, Mod2 = spacing, Mod 3 = color peaking	56			
			Fuzzifier. Mod1 = Horizontal distance, Mod2 = vertical distance, Mod3 = fuzz decay	57			
			Drop Shadow. Mod1 = horizontal size, Mod2 = vertical size, Mod3 = shadow opacity	58			
			Zoom Blur. Mod1 = horizontal position center, Mod2 = vertical position center, Mod3 = zoom	59			
			Chroma Shift. Mod1 = horizontal shift, Mod2 = vertical shift, Mod3 = Scale	60			
			ShakeNBake. Mod1 = horizontal shake, Mod2 = vertical shake, Mod3 = Scale	61			
			Slats, Vertical. Mod1 = number, Mod2 = displacement, Mod3 = fade	62			

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
23	2	**Global Effect 1**	Slats, Horizontal. Mod1 = number, Mod2 = displacement, Mod3 = fade	63	NA	0	0
			Reserved. Defaults to effect mode = 0	64-79			
			Downward Vertical Streaks. Mod1 = start position, Mod2 = streak angle, Mod3 = fade	80			
			Gaussian Blur. Mod1 = sample distance, Mod2 = filter pass number, Mod3 = scales the effect	81			
			Sharpen. Mod1 = sample distance, Mod2 = filter pass number, Mod3 = sharpen scale	82			
			Reserved. Defaults to effect mode = 0	83-127			
			Mask color. Mod1 = red, Mod2 = green, Mod3 = blue	128			
			Edge fade color. Mod1 = red, Mod2 = green, Mod3 = blue	129			
			Mask color and Edge fade color. Mod1 = red, Mod2 = green, Mod3 = blue	130			
			Background Color. Mod1 = red, Mod2 = green, Mod3 = blue	131			
			Background Color Cycle. Mod1 = red speed, Mod2 = green speed, Mod3 = blue speed	132			
			Framing. Mod1 = Mode, Mod2 = Profile, Mod3 = Source	133			
			Collage. Mod1= grid style selection, Mod2=grid portion displayed, Mod3=edge blend adjustment	134			
			Corrects output for vertical convex cylinder. Mod1= correction, Mod2= adjusts vertical centerpoint, Mod3= Not used	135			
			Corrects output for vertical concave cylinder. Mod1= correction, Mod2= adjusts vertical centerpoint, Mod3= Not used	136			
			Corrects output for vertical inside corner. Mod1= correction, Mod2= adjusts vertical centerpoint, Mod3= adjusts horizontal centerpoint	137			
			Corrects output for vertical outside corner. Mod1= correction, Mod2= adjusts vertical centerpoint, Mod3= adjusts horizontal centerpoint	138			
			Curved Surface, Outside Sphere. Mod1= correction, Mod2= adjusts vertical centerpoint, Mod3= adjusts horizontal centerpoint	139			
			Curved Surface, Inside Sphere. Mod1= correction, Mod2= adjusts vertical centerpoint, Mod3= adjusts horizontal centerpoint.	140			
			Enhanced Collage. Mod1= grid style selection, Mod2=grid portion displayed, Mod3=edge blend	141			
			Spherical mapping, Outside. Mod1=logitude angle, Mod2=latitude angle, Mod3-center latitude.	142			
			Spherical mapping, Inside. Mod1=logitude angle, Mod2=latitude angle, Mod3-center latitude.	143			
			Mattes. Mod1=Mode, Mod2=Matte Select, Mod3=texture source	144			

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
23	2	**Global Effect 1**	Reserved. Defaults to effect 0	145-254	NA	0	0
			Pan and Scale. Mod1 = horizontal position, Mod2 = vertical position, Mod3 = Zoom	255			
24	3	**Global Effect 1 Modifier 1**	These Modifier parameters adjust the option selected in Channel 23 for DL.2 fixtures or Channel 2 for Axon Media Servers. The type of adjustment and the default value depends on the particular effect. For more about Modifier parameter functionality, see *Global Effect Mode 1 and Effect Mode 2 on page 86*, and specific effect options listed alphabetically in *Chapter 12.*	0-255	0-100	NA	NA
25	4	**Global Effect 1 Modifier 2**		0-255	0-100		
26	5	**Global Effect 1 Modifier 3**		0-255	0-100		

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
27	6	**Global Effect 2**	Off, no effects selection	0	0	0	0
			CMY simulates CMY by subtracting RGB. Reduces color values. Mod1=cyan, Mod2=magenta, Mod3 =yellow	1	NA		
			CMY adds to all pixels. Increases color values. Mod1= cyan, Mod2 =magenta, Mod3 =yellow	2			
			CMY adds to non-black pixels. Increases color values. Mod1=cyan, Mod2=magenta, Mod3= yellow	3			
			RGB Add, all pixels. Mod1=red, Mod2=green, Mod3=blue	4			
			RGB Add 2, all pixels. Mod1=red, Mod2=green, Mod3=blue	5			
			RGB Add, non-black pixels. Mod1=red, Mod2=green, Mod3= blue	6			
			RGB Swap to GBR, Mod1=red, Mod2=green, Mod3=blue.	7			
			RGB Swap to BRG, Mod1= red Mod2 =green, Mod3= blue.	8			
			Solarize 1 If color value < DMX value, invert color. Mod1=red, Mod2= green, Mod3= blue.	9			
			Solarize 2 If color value > DMX, invert color. Mod1= red, Mod2=green, Mod3=blue.	10			
			Solarize 3 If color value < DMX, set color to 0. Mod1=red, Mod2=green, Mod3=blue.	11			
			Solarize 4 If color value > DMX, set color to 0. Mod1=red, Mod2= green, Mod3 -> blue.	12			
			DotP and Resample. Mod1, Mod2 and Mod3 control resampling.	13			
			Color Cycle, DMX value controls cycle speed. Mod1= red, Mod2 = green, Mod3 = blue.	14			
			All or nothing. Mod1=red, Mod2=green, Mod3=blue. If color value > mod value, color = 255, else color = 0	15			
			Solid color RGB, Mod1=red, Mod2=green, Mod3=blue.	16			
			RGB Invert Mod1 = red to inverted red, Mod2 = green to inverted green, Mod3 = blue to inverted blue	17			
			RGB Invert & Swap to GBR. Mod1 = red to inverted green, Mod2 = green to inverted blue, Mod3 = blue to inverted red	18			
			RGB Invert & Swap to BRG. Mod1 = red to inverted blue, Mod2 = green to inverted red, Mod3 = blue to inverted green	19			
			Edge Detect Color. Mod1 =horizontal size, Mod2 = vertical search size, Mod3 =comparison threshold	20			

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
27	6	**Global Effect 2**	Edge Detect B/W. Mod1=horizontal size, Mod2 = vertical search size, Mod3=comparison threshold	21	NA	0	0
			Texture Ripple, Horizontal Mod1=size, Mod2=rate, Mod3=offset	22			
			Texture Ripple, Vertical Mod1=size, Mod2=rate, Mod3=offset	23			
			Texture Ripple, Circular Mod1=size, Mod2=rate, Mod3=offset	24			
			Texture Ripple, Asymmetrical Circular Mod1=size, Mod2=rate, Mod3=offset	25			
			Chromakey Fine. Select key color using Mod1=red, Mod2 =green, Mod3 =blue	26			
			Chromakey Medium. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	27			
			Chromakey Coarse. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	28			
			Chromakey Inverse, Fine. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	29			
			Chromakey Inverse, Medium. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	30			
			Chromakey Inverse, Coarse. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	31			
			Scan Line. Mod1 selects scan line as texture, Mod2 fades from original image to converted image, Mod3 not used, reserved	32			
			Transparent wipes. Mod1 =width of transparent area, Mod2 =center of transparent area, Mod3=transparency mode	33			
			Pixel Twist. Mod1 = x twist center, Mod2 = y twist center, Mod3 =direction and amount of twist	34			
			Picture-in-Picture. Mod1= x subpicture center, Mod2 = y subpicture center, Mod3= subpicture size	35			
			Magnifying lens, Mod1 =x lens center, Mod2 =y lens center, Mod3 lens size	36			
			Magnifying lens 2, Mod1= x lens center, Mod2 = y lens center, Mod3 = lens size	37			
			Cartoon Edge Mod1 = Edge Color, Mod2= Contrast, Mod3= Edge detection sensitivity	38			
			Color DeConverge Mod1= Moves red up, Mod2 = Moves green down and right, Mod3 = Moves blue down and left	39			
			Horizontal Mirror, Mod1 = mirror center, Mod2 and Mod3 not used	40			
			RGB Swap to BGR Mod1 = red, Mod2 = green, Mod3 = blue	41			
			RGB Swap to RBG Mod1 = red, Mod2 = green, Mod3 = blue	42			

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
27	6	**Global Effect 2**	RGB Swap to GRB Mod1 = red, Mod2 = green, Mod3 = blue	43	NA	0	0
			Colorize Gray Scale maps pixel intensity to color: Mod1 = Color Scheme selection, Mod2 = Zero intensity point in color scheme, Mod3 = Fading	44			
			Intensity key turns pixels of selected intensity transparent: Mod1= Color Scheme, Mod2= Intensity bandwidth, Mod3 = Transparency	45			
			Raindrop effect. Mod1 = size/speed, Mod2=position, and Mod3 = raindrop rate.	46			
			Scale RGB. Mod1 = scale red, Mod2 = scale green, Mod3 = scale blue. Maximum of Mod1, Mod2 and Mod3 sets overall color range	47			
			Reserved. Defaults to effect 0	48			
			Color to Alpha. Mod1 = red to alpha, Mod2 = green to alpha, Mod3 = blue to alpha	49			
			Color to Alpha, Inverted. Mod1 = inverted red to alpha, Mod2 = inverted green to alpha, Mod3 = inverted blue to alpha	50			
			Texture Mixing. Mod1= Source media file, Mod2 = Source effect level, Mod3= Crossfade from original to source texture	51			
			Image Scale and Rotate. Mod1=scales image, Mod2= rotation angle, Mod3=rotation speed	52			
			Film Roll. Mod1=horizontal roll speed, Mod2=vertical roll speed, Mod3=Image scale	53			
			Pixelate. Mod1=Amount of pixelation, Mod2=horizontal scaler, Mod3=vertical scaler	54			
			Faux LED. Mod1 = ”LED” size, Mod2 = spacing, Mod 3 = color peaking	55			
			Faux Tile. Mod1 = Tile size, Mod2 = spacing, Mod 3 = color peaking	56			
			Fuzzifier. Mod1 = Horizontal distance, Mod2 = vertical distance, Mod3 = fuzz decay	57			
			Drop Shadow. Mod1 = horizontal shadow size, Mod2 = vertical shadow size, Mod3 = shadow opacity	58			
			Zoom Blur. Mod1 = horizontal position center, Mod2 = vertical position center, Mod3 = zoom	59			
			Chroma Shift. Mod1 = horizontal shift, Mod2 = vertical shift, Mod3 = Scale	60			
			ShakeNBake. Mod1 = horizontal shake, Mod2 = vertical shake, Mod3 = Scale	61			
			Slats, Vertical. Mod1 = number, Mod2 = displacement, Mod3 = fade	62			
			Slats, Horizontal. Mod1 = number, Mod2 = displacement, Mod3 = fade	63			
			Reserved. Defaults to effect mode = 0	64-79			

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
27	6	**Global Effect 2**	Downward Vertical Streaks. Mod1 = start position, Mod2 = streak angle, Mod3 = fade	80	NA	0	0
			Gaussian Blur. Mod1 = sample distance, Mod2 = filter pass number, Mod3 = curve shape	81			
			Sharpen. Mod1 = sample distance, Mod2 = filter pass number, Mod3 = sharpen scale	82			
			Reserved. Defaults to effect mode = 0	83-127			
			Mask color. Mod1 = red, Mod2 = green, Mod3 = blue	128			
			Edge fade color. Mod1 = red, Mod2 = green, Mod3 = blue	129			
			Mask color and Edge fade color. Mod1 = red, Mod2 = green, Mod3 = blue	130			
			Background Color. Mod1 = red, Mod2 = green, Mod3 = blue	131			
			Background Color Cycle. Mod1 = red speed, Mod2 = green speed, Mod3 = blue speed	132			
			Framing. Mod1 = Mode, Mod2 = Profile, Mod3 = Source	133			
			Collage. Mod1= grid style selection, Mod2=grid portion displayed, Mod3=edge blend adjustment	134			
			Corrects output for vertical convex cylinder. Mod1= correction, Mod2= adjusts vertical centerpoint, Mod3= Not used	135			
			Corrects output for vertical concave cylinder. Mod1= correction, Mod2= adjusts vertical centerpoint, Mod3= Not used	136			
			Corrects output for vertical inside corner. Mod1= correction, Mod2= adjusts vertical centerpoint, Mod3= adjusts horizontal centerpoint	137			
			Corrects output for vertical outside corner. Mod1= correction, Mod2= adjusts vertical centerpoint, Mod3= adjusts horizontal centerpoint	138			
			Curved Surface, Outside Sphere. Mod1= correction, Mod2= adjusts vertical centerpoint, Mod3= adjusts horizontal centerpoint	139			
			Curved Surface, Inside Sphere. Mod1= correction, Mod2= adjusts vertical centerpoint, Mod3= adjusts horizontal centerpoint.	140			
			Enhanced Collage. Mod1= grid style selection, Mod2=grid portion displayed, Mod3=edge blend.	141			
			Spherical Mapping, Outside. Mod1=logitude angle, Mod2=latitude angle, Mod3-center latitude.	142			
			Spherical Mapping, Inside. Mod1=logitude angle, Mod2=latitude angle, Mod3-center latitude.	143			
			Mattes. Mod1=Mode, Mod2=Matte Select, Mod3=texture source	144			
			Reserved. Defaults to effect 0	145-254			

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
27	6	**Global Effect 2**	Pan and Scale. Mod1 = horizontal position, Mod2 = vertical position, Mod3 = Zoom	255	100	0	0
28	7	**Global Effect 2 Modifier 1**	These Modifier parameters adjust the option selected in Channel 27 for DL.2 fixtures or Channel 3 for Axon Media Servers. The type of adjustment and the default value depends on the particular effect. For more about Modifier functionality, see *Global Effect Mode 1 and Effect Mode 2 on page 86*, and specific effect options listed alphabetically in *Chapter 12*.	0-255	0-100	NA	NA
29	8	**Global Effect 2 Modifier 2**		0-255	0-100		
30	9	**Global Effect 2 Modifier 3**		0-255	0-100		

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
Global Mask							
31	10	**Mask Select**	***Static Masks***			0	0
			Round *iris* closing from outside in	0	0		
			Round *iris* closing from inside out	1	NA		
			Rectangle closing from outside in	2			
			Rectangle closing from inside out	3			
			Checkerboard, variation 1	4			
			Checkerboard, variation 2	5			
			Radial wipe, variation 1	6			
			Radial wipe, variation 2	7			
			Radial wipe, variation 3	8			
			Radial wipe, variation 4	9			
			Triangles, variation 1	10			
			Triangles, variation 2	11			
			Rectangular wrap	12			
			Tiles closing in	13			
			Horizontal doors, closing	14			
			Horizontal doors closing from opposing sides	15			
			Vertical doors closing from outside in	16			
			Vertical wipe closing from inside out	17			
			Rectangular tiles closing from inside out 1	18			
			Rectangular tiles closing from inside out 2	19			
			Vertical panels closing from outside in 1	20			
			Vertical panels closing from outside in 2	21			
			Vertical diamonds 1	22			
			Vertical diamonds 2	23			
			Horizontal diamonds 1	24			
			Horizontal diamonds 2	25			
			Pinwheel	26			
			Oval Iris closing from outside in	27			
			Oval Iris closing from inside out	28			
			Oscillating iris closing from outside in	29			
			Artistic Iris	30			
			Reserved for other installed masks, defaults to 0	31-127			
			Strobing Masks				
			Periodic strobe, round “iris” mask closing from outside in.	128			
			Round *iris* closing from inside out	129			
			Rectangle closing from outside in	130			
			Rectangle closing from inside out	131			

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
31	10	**Mask Select**	Checkerboard, variation 1	132	NA	0	0
			Checkerboard, variation 2	133			
			Radial wipe, variation 1	134			
			Radial wipe, variation 2	135			
			Radial wipe, variation 3	136			
			Radial wipe, variation 4	137			
			Triangles, variation 1	138			
			Triangles, variation 2	139			
			Rectangular wrap	140			
			Tiles closing in	141			
			Horizontal doors, closing	142			
			Horizontal doors closing from opposing sides	143			
			Vertical doors closing from outside in	144			
			Vertical wipe closing from inside out	145			
			Rectangular tiles closing from inside out 1	146			
			Rectangular tiles closing from inside out 2	147			
			Vertical panels closing from outside in 1	148			
			Vertical panels closing from outside in 2	149			
			Vertical diamonds 1	150			
			Vertical diamonds 2	151			
			Horizontal diamonds 1	152			
			Horizontal diamonds 2	153			
			Pinwheel	154			
			Oval Iris closing from outside in	155			
			Oval Iris closing from inside out	156			
			Oscillating iris closing from outside in	157			
			Animated Dynamic Iris	158			
			Reserved for other strobing installed masks	159-255			
32	11	**Mask Size**	Adjusts mask size from fully closed to open	0-255	0-100	255	100
33	12	**Mask Edge Fade**	Hard edge to faded edge when Mask Select=0-127. Strobe rate control from Fastest to slowest when Mask Select parameter value = 128-255	0-255	0-100	0	0
Global Image Edge Fade							
34	13	**Image Edge Fade, Top**	Adjusts the image's top edge diffusion from hard edge (0) to maximum fade (255)	0-255	0-100	0	0
35	14	**Image Edge Fade, Right**	Adjusts the image's right edge diffusion from hard edge (0) to maximum fade (255)	0-255	0-100	0	0
36	15	**Image Edge Fade, Bottom**	Adjusts the image's bottom edge diffusion from hard edge (0) to maximum fade (255)	0-255	0-100	0	0
37	16	**Image Edge Fade, Left**	Adjusts the image's left edge diffusion from hard edge (0) to maximum fade (255)	0-255	0-100	0	0

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
Global Keystone Correction							
38	17	**Top Left X**	Move top left corner x value to center	0-255	0-100	0	0
39	18	**Top Left Y**	Move top left corner y value to center	0-255	0-100	0	0
40	19	**Top Right X**	Move top right corner x value to center	0-255	0-100	0	0
41	20	**Top Right Y**	Move top right corner y value to center	0-255	0-100	0	0
42	21	**Bottom Right X**	Move bottom right corner x value to center	0-255	0-100	0	0
43	22	**Bottom Right Y**	Move bottom right corner y value to center	0-255	0-100	0	0
44	23	**Bottom Left X**	Move bottom left corner x value to center	0-255	0-100	0	0
45	24	**Bottom Left Y**	Move bottom left corner y value to center	0-255	0-100	0	0
46	25	**X Ratio**	Shifts the image density along the X-axis	0-255	0-100	128	50
47	26	**Y Ratio**	Shifts the image density along the Y-axis	0-255	0-100	128	50
Global Viewpoint							
48	27	**Viewpoint Mode**	***Perspective View, Spherical Coordinates***			0	0
			Look at point: center of universe	0	0		
			Look at point: graphic 1	1	NA		
			Look at point: graphic 2	2			
			Look at point: graphic 3	3			
			Perspective View, Cartesian Coordinates				
			Look at point: center of universe	4	0		
			Look at point: graphic 1	5	NA		
			Look at point: graphic 2	6			
			Look at point: graphic 3	7			
			Orthogonal View, Cartesian Coordinates				
			Look at point: center of universe	8	0		
			Look at point: graphic 1	9	NA		
			Look at point: graphic 2	10			
			Look at point: graphic 3	11			
			Reserved	12-255			
49	28	**Viewpoint X Position**	Maximum horizontal angle clockwise	0	0-	32768	50
			Center	32768	50		
50	29		Maximum horizontal angle counterclockwise	65535	100		
51	30	**Viewpoint Y Position**	Maximum Vertical angle clockwise	0	0-	32768	50
			Center	32768	50		
52	21		Maximum Vertical angle counterclockwise	65535	100		
53	32	**Viewpoint Z Position (Zoom)**	Maximum distance from origin in front of view target	0	0	30260	49
			Center	32768	50		
54	33		Maximum distance from origin behind view target	65535	100		

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
55	34	**Global Control ***	No control selected. Safe	0	0	0	0
			Reserved	1-119	NA		
			Axon Shutdown when Intensity = 0 (80)	120-130			
			Reserved	131-144			
			Reset when Intensity = 0 (80)	145-149			
			Reserved	150-251			
			Spherical Control Statistics (Global Control Modifier Parameter selects text color)	252			
			Four-in-one displays each layers output and combined output in a 2 x 2 array.	253			
			Reserved	254			
			On-screen Statistics	255			
			Reserved	4-255			
56	35	**Global Control Modifier**	***Four-in-one Combined Quadrant (Channel 55 = 253)***			0	0
			Displays the selected media file for each graphic object plus the final composite image	0-9	NA		
			Displays the selected media file for each graphic object plus the final composite image and the image's position in an applied collage effect	10-19			
			Displays the current media file for each graphic object plus the final composite image with the result of an applied collage effect and curved surface adjustment.	20-30			
			Displays the media file for each graphic object plus the first effect applied to it (if any).	31			
			Displays the media file for each graphic object with up to two effects applied to it.	32			
			Displays the media file for each graphic object with up to the first three effects applied to it.	33			
			Reserved	34-255			
			On-screen Frame Statistics (Channel 55 = 255)				
			Text color = gray	0	NA		
			Text color = red	1			
			Text color = blue	2			
			Text color = green	3			

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
Graphic 1 Functions (Standard, Dual, Single Protocol)							
57	36	**Opacity**	Selects transparency level from completely transparent (0) to opaque (255)	0-255	0-100	0	0
Graphic 1 Content Definition							
58	37	**3-D Object File**	No selection	0	0	1	1
			First Stock 3-D Object (flat plane)	1	1		
			Additional Stock 3-D Objects	2-149	NA		
			First User 3-D Objects	150			
			Additional User Objects	151-255			
59	38	**Media Folder**	No selection	0	NA	0	0
			HES Folder 1	1			
			HES Folders 2- 40	2-40			
			First User Folder 41	41			
			User Folders 42-239	42-239			
			Reserved	240-254			
			Integrated video camera capture. The Media File parameter is ignored	255			
60	39	**Media File**	No selection	0	0	0	0
			First Media File	1	NA		
			Additional Media Files 2-255	2-255			
61 62	40 41	**In Frame**	Defines the beginning of a media file segment as a percentage of the movie length	0-65535	0-100	0	0
63 64	42 43	**Out Frame**	Defines the end of a Media File segment as a percentage of the movie length	0-65535	0-100	65535	100
65	44	**Play Mode**	Play forward looping continuously	0	0	0	0
			Play forward once and hold on the last frame	1	NA		
			Pause	2			
			Play forward if opacity > 0, hold on last frame	3			
			Play forward if opacity > 0, looping continuously	4			
			Pause and rewind to In Frame	5			
			Scrub (Display) the selected In Frame	6			
			Scrub (Display) the selected Out Frame	7			
			Scrub (Display) the selected In Frame with statistics	8			
			Scrub (Display) the selected Out Frame with statistics	9			
			Reserved	10-255	3-100		
66	45	**Play Speed**	Normal Speed	0	0	128	50
			Slow speeds from slowest toward normal	1-127	1-49		
			Normal Speed	128	50		
			Faster than Normal to Fastest	129-255	51-100		

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
Graphic 1 Synchronization							
67	46	**Sync Mode**	No selection	0	0	0	0
			Sync to Graphic 1 movie time	1	NA		
			Sync to Graphic 2 movie time	2			
			Sync to Graphic 3 movie time	3			
			Sync to Object rotation 1	4			
			Sync to Object rotation 2	5			
			Sync to Object rotation 3	6			
			Sync to reverse Object rotation 1	7			
			Sync to reverse Object rotation 2	8			
			Sync to reverse Object rotation 3	9			
			Sync to Graphic movie time and rotation 1	10			
			Sync to Graphic movie time and rotation 2	11			
			Sync to Graphic movie time and rotation 3	12			
			Sync to Graphic movie time + reverse rotation 1	13			
			Sync to Graphic movie time + reverse rotation 2	14			
			Sync to Graphic movie time + reverse rotation 3	15			
			Reserved. Defaults to mode 0, no selection.	16- 255			
68	47	**Sync To**	No Selection	0	NA	0	0
			Sync to Fixture ID Number 1	1			
			Sync to Fixture ID Number 2 . . .	2 . . .			
			Sync to Fixture Number 254	254			
			Sync to Fixture ID Number 255	255			
Graphic 1 Effects							
69	48	**Visual Mode**	Off. No visual mode processing applied to output.	0	NA	1	1
			Content Optimization Mod1=black level, Mod2=contrast.	1			
			Sepia tones. Mod1 fades from original color to sepia colors. Mod2 controls saturation.	2			
			Red tones. Mod1 fades from original color to red tones. Mod2 controls saturation.	3			
			Gray maker. Mod1 compresses colors to shades of gray. Mod2 adjusts contrast	4			
			Gray maker2. Always gray. Mod1 = brightness, Mod2 = contrast	5			
			Posterizer. Mod1 reduces color detail. Mod2 adjusts contrast.	6			
			Color to Black & White. Mod1 fades color RGB @ 0 to B/W @ 50% to white @100%. Mod2= not used.	7			
			Fire Gradient, Mod1fades original to converted Mod2 not used, reserved.	8			

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
69	48	**Visual Mode**	Negative Art. Mod1 fades from original image to converted image, Mod2 subtracts red from 0-128, subtracts green from 129-255.	9	NA	1	1
			Exposure Control. Mod1 adjusts color contrast, Mod2 adjusts color shift	10			
			Invert B&W, Keep Color. Mod1 = black comparison level, Mod2= white comparison level	11			
			Texture Mixing. Mod1= Source media file, Mod2= Crossfade from original to source texture	12			
			Image Scale and Rotate. Mod1=image scale, Mod2=rotation angle.	13			
			Film Roll. Mod1=horizontal roll speed, Mod2=Vertical roll speed	14			
			Pixelate. Mod1 = amount of pixelation, Mod 2 not used	15			
			Faux LED. Mod1 = ”LED” size, Mod2 = spacing	16			
			Faux Tile. Mod1 = Tile size, Mod2 = spacing	17			
			Fuzzifier. Mod1 = x-axis distance, Mod2 = y-axis distance	18			
			Drop Shadow. Mod1 = horizontal shadow size, Mod2 = vertical shadow size	19			
			Zoom Blur. Mod1 = horizontal position center, Mod2 = vertical position center	20			
			Chroma Shift. Mod1 = horizontal shift, Mod2 = vertical shift	21			
			ShakeNBake. Mod1 = horizontal shake, Mod2 = vertical shake	22			
			Reserved (Defaults to 0)	19-254			
			Pan and Scan. Mod1 = horizontal position, Mod2 = vertical position	255			
70	49	**Visual Mode Modifier 1**	Adjusts option selected in Channel 69 for DL.2 fixtures or Channel 46 for Axon Media Servers. The type of adjustment and the default value depends on the particular visual mode option. For more about Modifier parameter functionality, see, *Visual Mode on page 58* and *Visual Mode Options on page 60*.	0-255	0-100		
71	50	**Visual Mode Modifier 2**		0-255	0-100		

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
72	51	**Effect Mode 1**	Off, no effects selection	0	0	0	0
			CMY simulates CMY by subtracting RGB (reduces color values) Mod1 = cyan, Mod2 = magenta, Mod3 = yellow	1	NA		
			CMY Add to All Pixels increases color values. Mod1 = cyan, Mod2 = magenta, Mod3 = yellow	2			
			CMY Add to Non-black Pixels increases color values. Mod1 = cyan, Mod2 = magenta, Mod3 = yellow	3			
			RGB Add All Pixels. Mod1 = red, Mod2 = green, Mod3 = blue	4			
			RGB Add 2 All Pixels. Mod1 = red, Mod2 = green, Mod3 = blue	5			
			RGB Add, non-black pixels. Mod1 = red, Mod2 = green, Mod3 = blue	6			
			RGB Swap to GBR Mod1 = red, Mod2 = green, Mod3 = blue.	7			
			RGB Swap to BGR Mod1 = red, Mod2 = green, Mod3 = blue.	8			
			Solarize 1 (if color value < DMX value, invert color) Mod1 = red, Mod2 = green, Mod3 = blue.	9			
			Solarize 2 (if color value > DMX, invert color) Mod1 = red, Mod2 = green, Mod3 = blue.	10			
			Solarize (if color value < DMX, set color to 0) Mod1 = red, Mod2 = green, Mod3 = blue.	11			
			Solarize 4 (if color value > DMX, set color to 0) Mod1 = red, Mod2 = green, Mod3 = blue.	12			
			DotP and Resample Mod1, Mod2 and Mod3 control resampling.	13			
			Color Cycle (DMX value controls cycle speed) Mod1 = red, Mod2 = green, Mod3 = blue.	14			
			All or Nothing (Color value greater than Mod value, color = 255, else color = 0) Mod1 = red, Mod2 = green, Mod3 = blue.	15			
			Solid Color RGB Mod1 = red, Mod2 = green, Mod3 = blue.	16			
			RGB Invert Mod1 = red to inverted red, Mod2 = green to inverted green, Mod3 = blue to inverted blue	17			
			RGB Invert & Swap to GBR Mod1 = red to inverted green, Mod2 = green to inverted blue, Mod3 = blue to inverted red	18			
			RGB Invert & Swap to BRG Mod1 = red to inverted blue, Mod2 = green to inverted red, Mod3 = blue to inverted green	19			
			Edge Detect Color. Mod1=horizontal size, Mod2 = vertical search size, Mod3=comparison threshold	20			
			Edge Detect B/W Mod1=horizontal size, Mod2 = vertical search size, Mod3=comparison threshold	21			

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
72	51	**Effect Mode 1**	Texture Ripple, Horizontal Mod1=size, Mod2=rate, Mod3=offset	22	NA	0	0
			Texture Ripple, Vertical Mod1=size, Mod2=rate, Mod3=offset	23			
			Texture Ripple, Circular Mod1=size, Mod2=rate, Mod3=offset	24			
			Texture Ripple, Asymmetrical Circular Mod1=size, Mod2=rate, Mod3=offset	25			
			Chromakey Fine. Select key color using Mod1=red, Mod2 =green, Mod3 =blue	26			
			Chromakey Medium. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	27			
			Chromakey Coarse. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	28			
			Chromakey Inverse, Fine. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	29			
			Chromakey Inverse, Medium. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	30			
			Chromakey Inverse, Coarse. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	31			
			Scan Line: Mod1 selects scan line as texture, Mod2 fades from original image to converted image, Mod3 not used, reserved	32			
			Transparent Wipes: Mod1 =width of transparent area, Mod2 =center of transparent area, Mod3=transparency mode	33			
			Pixel Twist. Mod1 = x twist center, Mod2 = y twist center, Mod3 =direction and amount of twist	34			
			Picture-in-Picture. Mod1= x subpicture center, Mod2 = y subpicture center, Mod3= subpicture size	35			
			Magnifying Lens. Mod1 =x lens center, Mod2 =y lens center, Mod3=lens size	36			
			Magnifying Lens 2. Mod1= x lens center, Mod2 = y lens center, Mod3 = lens size	37			
			Cartoon Edge. Mod1 = Edge Color, Mod2= Contrast, Mod3= Edge detection sensitivity	38			
			Color DeConverge Mod1= Moves red up, Mod2 = Moves green down and right, Mod3 = Moves blue down and left	39			
			Horizontal Mirror, Mod1 = mirror center, Mod2 and Mod3 not used	40			
			RGB Swap to BGR Mod1 = red, Mod2 = green, Mod3 = blue	41			
			RGB Swap to RBG Mod1 = red, Mod2 = green, Mod3 = blue	42			
			RGB Swap to GRB Mod1 = red, Mod2 = green, Mod3 = blue	43			

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
72	51	**Effect Mode 1**	Colorize Gray Scale maps pixel intensity to color: Mod1 = Color Scheme selection, Mod2 = Zero intensity point in color scheme, Mod3 = Fading	44	NA	0	0
			Intensity key turns pixels of selected intensity transparent: Mod1= Color Scheme, Mod2= Intensity bandwidth, Mod3 = Transparency	45			
			Raindrop effect. Mod1 controls size/speed, Mod2 seeds the random number generator, and Mod3 controls raindrop rate.	46			
			Scale RGB. Mod1= scale red, Mod2=scale green, Mod3=scale blue. Maximum of Mod1, Mod2 and Mod3 sets overall color range	47			
			Tiling On (Scaler of 128=1 to 1) *Note: Tiling on Mode 1 overrides tiling on Effect Mode 2* Mod1=x-axis tiling scaler, Mod2=y-axis tiling scaler. Mod3 not used.	48			
			Color to Alpha. Mod1 = red to alpha, Mod2 = green to alpha, Mod3 = blue to alpha	49			
			Color to Alpha, Inverted. Mod1 = inverted red to alpha, Mod2 = inverted green to alpha, Mod3 = inverted blue to alpha	50			
			Texture Mixing. Mod1= Source media file, Mod2= Source effect level, Mod3= Crossfade from original to source texture	51			
			Image Scale and Rotate. Mod1=scales image, Mod2= rotation angle, Mod3=rotation speed	52			
			Film Roll. Mod1=horizontal roll speed, Mod2=vertical roll speed, Mod3=Image scale	53			
			Pixelate. Mod1=Amount of pixelation, Mod2=horizontal scaler, Mod3=vertical scaler	54			
			Faux LED. Mod1 = ”LED” size, Mod2 = spacing, Mod 3 = color peaking	55			
			Faux Tile. Mod1 = Tile size, Mod2 = spacing, Mod 3 = color peaking	56			
			Fuzzifier. Mod1 = Horizontal distance, Mod2 = vertical distance, Mod3 = fuzz decay	57			
			Drop Shadow. Mod1 = horizontal shadow size, Mod2 = vertical shadow size, Mod3 = shadow opacity	58			
			Zoom Blur. Mod1 = horizontal position center, Mod2 = vertical position center, Mod3 = zoom	59			
			Chroma Shift. Mod1 = horizontal shift, Mod2 = vertical shift, Mod3 = Scale	60			
			ShakeNBake. Mod1 = horizontal shake, Mod2 = vertical shake, Mod3 = Scale	61			
			Slats, Vertical. Mod1 = number, Mod2 = displacement, Mod3 = fade	62			
			Slats, Horizontal. Mod1 = number, Mod2 = displacement, Mod3 = fade	63			
			Sinewave, Circular with Y-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	64			

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
72	51	**Effect Mode 1**	Sinewave, Circular with Y-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	65	72	0	0
			Sinewave, Circular with Z-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	66			
			Sinewave, Horizontal with X-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	67			
			Sinewave, Horizontal with Y-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	68			
			Sinewave, Horizontal with Z-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	69			
			Sinewave, Vertical with X-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	70			
			Sinewave, Vertical with Y-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	71			
			Sinewave, Vertical with Z-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	72			
			Glow: Mod1 =red, Mod2 = green, Mod3 =blue	73			
			Glow Color Cycle: Mod1= red cycle speed, Mod2= green cycle speed, Mod3= blue cycle speed	74			
			Reserved, defaults to Effect 0	75-79			
			Downward Vertical Streaks. Mod1 = start position, Mod2 = streak angle, Mod3 = fade	80			
			Gaussian Blur. Mod1 = sample distance, Mod2 = filter pass number, Mod3 = curve shape	81			
			Sharpen. Mod1 = sample distance, Mod2 = filter pass number, Mod3 = sharpen scale	82			
			Reserved. Defaults to effect mode = 0	83-252			
			Spherical mapping control 1. Mod 1= projector y-offset, Mod2=sphere y-offset, Mod3=vertical size. (Defaults to 0 and is ignored unless Spherical Mapping is selected as a Global Effect option)	253			
			Spherical mapping control 2. Mod 1= vertical bend correction, Mod2=vertical bend correction center, Mod3=horizontal size adjustment. (Defaults to 0 and is ignored unless Spherical Mapping is selected as a Global Effect option)	254			
			Pan and Scan. Mod1 = horizontal position, Mod2 = vertical position, Mod3 = Zoom	255			
73	52	**Effect Mode 1 Modifier 1**	These Modifier parameters adjust the option selected in Channel 72 for DL.2 fixtures or Channel 51 for Axon Media Servers. The type of adjustment and the default value depends on the particular effect. NOTE: Setting the Graphic Effect Mode DMX= 253 or 254 activates specific spherical mapping control options for Modifier parameters. For more about Modifier parameter functionality, see *Effect 1 Mode and Effect 2 Mode on page 78*, and specific effect options listed alphabetically in *Chapter 12.*	0-255	0-100	NA	NA
74	53	**Effect Mode 1 Modifier 2**		0-255	0-100		
75	54	**Effect Mode 1 Modifier 3**		0-255	0-100		

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
76	55	**Effect Mode 2**	Off, no effects selection	0	NA	0	0
			CMY simulates CMY by subtracting RGB (reduces color values) Mod1 = cyan, Mod2 = magenta, Mod3 = yellow	1			
			CMY Add to All Pixels increases color values. Mod1 = cyan, Mod2 = magenta, Mod3 = yellow	2			
			CMY Add to Non-black Pixels increases color values. Mod1 = cyan, Mod2 = magenta, Mod3 = yellow	3			
			RGB Add All Pixels. Mod1 = red, Mod2 = green, Mod3 = blue	4			
			RGB Add 2 All Pixels. Mod1 = red, Mod2 = green, Mod3 = blue	5			
			RGB Add, non-black pixels. Mod1 = red, Mod2 = green, Mod3 = blue	6			
			RGB Swap to GBR Mod1 = red, Mod2 = green, Mod3 = blue.	7			
			RGB Swap to BGR Mod1 = red, Mod2 = green, Mod3 = blue.	8			
			Solarize 1 (if color value < DMX value, invert color) Mod1 = red, Mod2 = green, Mod3 = blue.	9			
			Solarize 2 (if color value > DMX, invert color) Mod1 = red, Mod2 = green, Mod3 = blue.	10			
			Solarize (if color value < DMX, set color to 0) Mod1 = red, Mod2 = green, Mod3 = blue.	11			
			Solarize 4 (if color value > DMX, set color to 0) Mod1 = red, Mod2 = green, Mod3 = blue.	12			
			DotP and Resample Mod1, Mod2 and Mod3 control resampling.	13			
			Color Cycle (DMX value controls cycle speed) Mod1 = red, Mod2 = green, Mod3 = blue.	14			
			All or Nothing (Color value greater than Mod value, color = 255, else color = 0) Mod1 = red, Mod2 = green, Mod3 = blue.	15			
			Solid Color RGB Mod1 = red, Mod2 = green, Mod3 = blue.	16			
			RGB Invert Mod1 = red to inverted red, Mod2 = green to inverted green, Mod3 = blue to inverted blue	17			
			RGB Invert & Swap to GBR Mod1 = red to inverted green, Mod2 = green to inverted blue, Mod3 = blue to inverted red	18			
			RGB Invert & Swap to BRG Mod1 = red to inverted blue, Mod2 = green to inverted red, Mod3 = blue to inverted green	19			
			Edge Detect Color. Mod1=horizontal size, Mod2= vertical search size, Mod3=comparison threshold	20			
			Edge Detect B/W Mod1=horizontal size, Mod2 = vertical search size, Mod3=comparison threshold	21			

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
76	55	**Effect Mode 2**	Texture Ripple, Horizontal Mod1=size, Mod2=rate, Mod3=offset	22	NA	0	0
			Texture Ripple, Vertical Mod1=size, Mod2=rate, Mod3=offset	23			
			Texture Ripple, Circular Mod1=size, Mod2=rate, Mod3=offset	24			
			Texture Ripple, Asymmetrical Circular Mod1=size, Mod2=rate, Mod3=offset	25			
			Chromakey Fine. Select key color using Mod1=red, Mod2 =green, Mod3 =blue	26			
			Chromakey Medium. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	27			
			Chromakey Coarse. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	28			
			Chromakey Inverse, Fine. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	29			
			Chromakey Inverse, Medium. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	30			
			Chromakey Inverse, Coarse. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	31			
			Scan Line: Mod1 selects scan line as texture, Mod2 fades from original image to converted image, Mod3 not used, reserved	32			
			Transparent Wipes: Mod1 =width of transparent area, Mod2 =center of transparent area, Mod3=transparency mode	33			
			Pixel Twist. Mod1 = x twist center, Mod2 = y twist center, Mod3 =direction and amount of twist	34			
			Picture-in-Picture. Mod1= x subpicture center, Mod2 = y subpicture center, Mod3= subpicture size	35			
			Magnifying Lens. Mod1 =x lens center, Mod2 =y lens center, Mod3=lens size	36			
			Magnifying Lens 2. Mod1= x lens center, Mod2= y lens center, Mod3 = lens size	37			
			Cartoon Edge. Mod1 = Edge Color, Mod2= Contrast, Mod3= Edge detection sensitivity	38			
			Color DeConverge. Mod1= Moves red up, Mod2 = Moves green down and right, Mod3 = Moves blue down and left	39			
			Horizontal Mirror, Mod1 = mirror center, Mod2 and Mod3 not used	40			
			RGB Swap to BGR Mod1 = red, Mod2 = green, Mod3 = blue	41			
			RGB Swap to RBG Mod1 = red, Mod2 = green, Mod3 = blue	42			
			RGB Swap to GRB Mod1 = red, Mod2 = green, Mod3 = blue	43			

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
76	55	**Effect Mode 2**	Colorize Gray Scale maps pixel intensity to color: Mod1 = Color Scheme selection, Mod2 = Zero intensity point in color scheme, Mod3 = Fading	44	NA	0	0
			Intensity key turns pixels of selected intensity transparent: Mod1= Color Scheme, Mod2= Intensity bandwidth, Mod3 = Transparency level	45			
			Raindrop effect. Mod1 controls size/speed, Mod2 seeds the random number generator, and Mod3 controls raindrop rate.	46			
			Scale RGB. Mod1= scale red, Mod2=scale green, Mod3=scale blue. Maximum of Mod1, Mod2 and Mod3 sets overall color range	47			
			Tiling On (Scaler of 128=1 to 1) *Note: Tiling on Mode 1 overrides tiling on Effect Mode 2* Mod1=x-axis tiling scaler, Mod2=y-axis tiling scaler. Mod3 not used.	48			
			Color to Alpha. Mod1 = red to alpha, Mod2 = green to alpha, Mod3 = blue to alpha	49			
			Color to Alpha, Inverted. Mod1 = inverted red to alpha, Mod2 = inverted green to alpha, Mod3 = inverted blue to alpha	50			
			Texture Mixing. Mod1= Source media file, Mod2= Source effect level, Mod3= Crossfade from original to source texture	51			
			Image Scale and Rotate. Mod1=scales image, Mod2= rotation angle, Mod3=rotation speed	52			
			Film Roll. Mod1=horizontal roll speed, Mod2=vertical roll speed, Mod3=Image scale	53			
			Pixelate. Mod1=Amount of pixelation, Mod2=horizontal scaler, Mod3=vertical scaler	54			
			Faux LED. Mod1 = ”LED” size, Mod2 = spacing, Mod 3 = color peaking	55			
			Faux Tile. Mod1 = Tile size, Mod2 = spacing, Mod 3 = color peaking	56			
			Fuzzifier. Mod1 = Horizontal distance, Mod2 = vertical distance, Mod3 = fuzz decay	57			
			Drop Shadow. Mod1 = horizontal shadow size, Mod2 = vertical shadow size, Mod3 = shadow opacity	58			
			Zoom Blur. Mod1 = horizontal position center, Mod2 = vertical position center, Mod3 = zoom	59			
			Chroma Shift. Mod1 = horizontal shift, Mod2 = vertical shift, Mod3 = Scale	60			
			ShakeNBake. Mod1 = horizontal shake, Mod2 = vertical shake, Mod3 = Scale	61			
			Slats, Vertical. Mod1 = number, Mod2 = displacement, Mod3 = fade	62			
			Slats, Horizontal. Mod1 = number, Mod2 = displacement, Mod3 = fade	63			
			Sinewave, Circular with Y-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	64			

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
76	55	**Effect Mode 2**	Sinewave, Circular with Y-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	65	NA	0	0
			Sinewave, Circular with Z-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	66			
			Sinewave, Horizontal with X-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	67			
			Sinewave, Horizontal with Y-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	68			
			Sinewave, Horizontal with Z-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	69			
			Sinewave, Vertical with X-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	70			
			Sinewave, Vertical with Y-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	71			
			Sinewave, Vertical with Z-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	72			
			Glow: Mod1 =red, Mod2 = green, Mod3 =blue	73			
			Glow Color Cycle: Mod1= red cycle speed, Mod2= green cycle speed, Mod3= blue cycle speed	74			
			Reserved, defaults to Effect 0	75-79			
			Downward Vertical Streaks. Mod1 = start position, Mod2 = streak angle, Mod3 = fade	80			
			Gaussian Blur. Mod1 = sample distance, Mod2 = filter pass number, Mod3 = curve shape	81			
			Sharpen. Mod1 = sample distance, Mod2 = filter pass number, Mod3 = sharpen scale	82			
			Reserved. Defaults to effect mode = 0	83-252			
			Spherical mapping control 1. Mod 1= projector y-offset, Mod2=sphere y-offset, Mod3=vertical size. (Defaults to 0 and is ignored unless Spherical Mapping is selected as a Global Effect option)	253			
			Spherical mapping control 2. Mod 1= vertical bend correction, Mod2=vertical bend correction center, Mod3=horizontal size adjustment. (Defaults to 0 and is ignored unless Spherical Mapping is selected as a Global Effect option)	254			
			Pan and Scan. Mod1 = horizontal position, Mod2 = vertical position, Mod3 = Zoom	255			
77	56	**Effect Mode 2 Modifier 1**	These Modifier parameters adjust the option selected in Channel 76 for DL.2 fixtures or Channel 55 for Axon Media Servers. The type of adjustment and the default value depends on the particular effect. NOTE: Setting the Graphic Effect Mode DMX= 253 or 254 activates specific spherical mapping control options for Modifier parameters. For more about Modifier parameter functionality, see *Effect 1 Mode and Effect 2 Mode on page 78*, and specific effect options listed alphabetically in *Chapter 12*.	0-255	0-100	NA	NA
78	57	**Effect Mode 2 Modifier 2**		0-255	0-100		
79	58	**Effect Mode 2 Modifier 3**		0-255	0-100		

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
Graphic 1 Rotation							
80 81	59 60	**X-axis Rotation** **(vertical flip, 16-bit adjustment)**	Continuous variable-speed counterclockwise object rotation around X-axis (fast to slow)	0-16382	0-24	32768	50
			Continuous rotation stop	16383	25		
			Rotates the object counterclockwise around X-axis in steps to -720 degrees absolute	16384-32767	26-49		
			0° rotation around X-axis	32768	50		
			Rotates the object clockwise around X-axis in steps to 720 degrees absolute	32769-49151	51-74		
			Continuous rotation stop	49152	75		
			Continuous variable-speed clockwise object rotation around X-axis (slow to fast)	49154-65535	76-100		
82 83	61 62	**Y-axis Rotation** **(horizontal flip, 16-bit adjustment)**	Continuous variable-speed counterclockwise object rotation around Y-axis (fast to slow)	0-16382	0-24	32768	50
			Continuous rotation stop	16383	25		
			Rotates the object counterclockwise around Y-axis in steps to -720 degrees absolute	16384-32767	26-49		
			0° rotation around Y-axis	32768	50		
			Rotates the object clockwise around Y-axis in steps to 720 degrees absolute	32769-49151	51-74		
			Continuous rotation stop	49152	75		
			Continuous variable-speed clockwise object rotation around Y-axis (slow to fast)	49154-65535	76-100		
84 85	63 64	**Z-axis Rotation** **(circular 16-bit adjustment)**	Continuous variable-speed counterclockwise object rotation around Z axis (fast to slow)	0-16382	0-24	32768	50
			Continuous rotation stop	16383	25		
			Rotates the object counterclockwise around Z-axis in steps to -720 degrees absolute	16384-32767	26-49		
			0° rotation around Z-axis	32768	50		
			Rotates the object clockwise around Z-axis in steps to 720 degrees absolute	32769-49151	51-74		
			Continuous rotation stop	49152	75		
			Continuous variable-speed clockwise object rotation around Z axis (slow to fast)	49154-65535	76-100		

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
Graphic 1 Scaling							
86	65	**Scale X**	Minimum object size along X axis (1:10)	0	0	128	50
			Increases object size along X axis from minimum to actual size	1-127	1-49		
			Actual size along X axis (1:1)	128	50		
			Increases object size along X axis from actual to maximum size	129-254	51-99		
			Maximum object size along X axis (10:1)	255	100		
87	66	**Scale Y**	Minimum object size along Y axis (1:10)	0	0	128	50
			Increases object size along Y axis from minimum to actual size	1-127	1-49		
			Actual size along Y axis (1:1)	128	50		
			Increases object size along Y axis from actual to maximum size	129-254	51-99		
			Maximum object size along Y axis (10:1)	255	100		
88	67	**Scale Z**	Minimum object size along Z axis (1:10)	0	0	128	50
			Increases object size along Z axis from minimum to actual size	1-127	1-49		
			Actual size along Z axis (1:1)	128	50		
			Increases object size along Z axis from actual to maximum size	129-254	51-99		
			Maximum object size along Z axis (10:1)	255	100		
Graphic 1 Position							
89	68	**X-Position**	Moves object left from center of display	0-36767	0-49	32768	50
			Centers object along X axis in display	32768	50		
90	69		Moves object right from center of display	36769-65535	51-100		
91	70	**Y-Position**	Moves object down from center of display	0-36767	0-49	32768	50
			Centers object along Y axis in display	32768	50		
92	71		Moves object up from center of display	36769-65535	51-100		
93	72	**Z-Position**	Moves object nearer from center of display	0-36767	0-49	32768	50
			Centers object along Z axis in display	32768	50		
94	73		Moves object back along Z axis at center of display	36769-65535	51-100		

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
Graphic 2 Functions (Standard, Dual)							
95	74	**Opacity**	Selects transparency level from completely transparent (0) to opaque (255)	0-255	0-100	255	100
Graphic 2 Content Definition							
96	75	**3-D Object File**	No selection	0	0	1	1
			First Stock 3-D Object (flat plane)	1	1		
			Additional Stock 3-D Objects	2-149	NA		
			First User 3-D Objects	150			
			Additional User Objects	151-255			
97	76	**Media Folder**	No selection	0	NA	0	0
			HES Folder 1	1			
			HES folder 2- 40	2-40			
			First User folder 41	41			
			User Folders 42-239	42-239			
			Reserved	240-254			
			Integrated video camera capture. The Media File parameter is ignored	255			
98	77	**Media File**	No selection	0	0	0	0
			First Media File	1	NA		
			Additional Media Files 2-255	2-255			
99 100	78 79	**In Frame**	Defines the beginning of a Media File segment as a percentage of the movie length	0-65535	0-100	0	0
101 102	80 81	**Out Frame**	Defines the end of a Media File segment as a percentage of the movie length	0-65535	0-100	65535	100
103	82	**Play Mode**	Play forward looping continuously	0	0	0	0
			Play forward once and hold on the last frame	1	NA		
			Pause	2			
			Play forward if opacity > 0, hold on last frame	3			
			Play forward if opacity > 0, looping continuously	4			
			Pause and rewind to In Frame	5			
			Scrub (Display) the selected In Frame	6			
			Scrub (Display) the selected Out Frame	7			
			Scrub (Display) the selected In Frame with statistics	8			
			Scrub (Display) the selected Out Frame with statistics	9			
			Reserved	10-255	3-100		
104	83	**Play Speed**	Normal Speed	0	0	128	50
			Slow speeds from slowest toward normal	1-127	1-49		
			Normal Speed	128	50		
			Faster than Normal to Fastest	129-255	51-100		

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
Graphic 2 Synchronization							
105	84	**Sync Mode**	No selection	0	0	0	0
			Sync to Graphic 1 movie time	1	NA		
			Sync to Graphic 2 movie time	2			
			Sync to Graphic 3 movie time	3			
			Sync to Object rotation 1	4			
			Sync to Object rotation 2	5			
			Sync to Object rotation 3	6			
			Sync to reverse Object rotation 1	7			
			Sync to reverse Object rotation 2	8			
			Sync to reverse Object rotation 3	9			
			Sync to Graphic movie time and rotation 1	10			
			Sync to Graphic movie time and rotation 2	11			
			Sync to Graphic movie time and rotation 3	12			
			Sync to Graphic movie time + reverse rotation 1	13			
			Sync to Graphic movie time + reverse rotation 2	14			
			Sync to Graphic movie time + reverse rotation 3	15			
			Reserved. Defaults to mode 0, no selection.	16- 255			
106	85	**Sync To**	No Selection	0	NA	0	0
			Sync to Fixture ID Number 1	1			
			Sync to Fixture ID Number 2 . . .	2 . . .			
			Sync to Fixture Number 254	254			
			Sync to Fixture ID Number 255	255			
Graphic 2 Effects							
107	86	**Visual Mode**	Off. No visual mode processing applied to output.	0	NA	1	1
			Content Optimization Mod1=black level, Mod2=contrast.	1			
			Sepia tones. Mod1 fades from original color to sepia colors. Mod2 controls saturation.	2			
			Red tones. Mod1 fades from original color to red tones. Mod2 controls saturation.	3			
			Gray maker. Mod1 compresses colors to shades of gray. Mod2 adjusts contrast	4			
			Gray maker2. Always gray. Mod1 = brightness, Mod2 = contrast	5			
			Posterizer. Mod1 reduces color detail. Mod2 adjusts contrast.	6			
			Color to Black & White. Mod1 fades color RGB @0 to B/W @50% to white @100%. Mod2= not used.	7			
			Fire Gradient, Mod1fades original to converted Mod2 not used, reserved.	8			

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
107	86	**Visual Mode**	Negative Art. Mod1 fades from original image to converted image, Mod2 subtracts red from 0-128, subtracts green from 129-255.	9	NA	1	1
			Exposure Control. Mod1 adjusts color contrast, Mod2 adjusts color shift	10			
			Invert B&W, Keep Color. Mod1 = black comparison level, Mod2= white comparison level	11			
			Texture Mixing. Mod1= Source media file, Mod2= Crossfade from original to source texture	12			
			Image Scale and Rotate. Mod1=image scale, Mod2=rotation angle.	13			
			Film Roll. Mod1=horizontal roll speed, Mod2=Vertical roll speed	14			
			Pixelate. Mod1 = amount of pixelation, Mod 2 not used	15			
			Faux LED. Mod1 = ”LED” size, Mod2 = spacing	16			
			Faux Tile. Mod1 = Tile size, Mod2 = spacing	17			
			Fuzzifier. Mod1 = x-axis distance, Mod2 = y-axis distance	18			
			Drop Shadow. Mod1 = horizontal shadow size, Mod2 = vertical shadow size	19			
			Zoom Blur. Mod1 = horizontal position center, Mod2 = vertical position center	20			
			Chroma Shift. Mod1 = horizontal shift, Mod2 = vertical shift	21			
			ShakeNBake. Mod1 = horizontal shake, Mod2 = vertical shake	22			
			Reserved (Defaults to 0)	19-254			
			Pan and Scan. Mod1 = horizontal position, Mod2 = vertical position	255			
108	87	**Visual Mode Modifier 1**	Adjusts option selected in Channel 107 for DL.2 fixtures or Channel 86 for Axon Media Servers. The type of adjustment and the default value depends on the particular visual mode option. For more about Modifier parameter functionality, see, *Visual Mode on page 58* and *Visual Mode Options on page 60*.	0-255	0-100	NA	NA
109	88	**Visual Mode Modifier 2**		0-255	0-100		

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
110	89	**Effect Mode 1**	Off, no effects selection	0	NA	0	0
			CMY simulates CMY by subtracting RGB (reduces color values) Mod1 = cyan, Mod2 = magenta, Mod3 = yellow	1			
			CMY Add to All Pixels increases color values. Mod1 = cyan, Mod2 = magenta, Mod3 = yellow	2			
			CMY Add to Non-black Pixels increases color values. Mod1 = cyan, Mod2 = magenta, Mod3 = yellow	3			
			RGB Add All Pixels. Mod1 = red, Mod2 = green, Mod3 = blue	4			
			RGB Add 2 All Pixels. Mod1 = red, Mod2 = green, Mod3 = blue	5			
			RGB Add, non-black pixels. Mod1 = red, Mod2 = green, Mod3 = blue	6			
			RGB Swap to GBR Mod1 = red, Mod2 = green, Mod3 = blue.	7			
			RGB Swap to BGR Mod1 = red, Mod2 = green, Mod3 = blue.	8			
			Solarize 1 (if color value < DMX value, invert color) Mod1 = red, Mod2 = green, Mod3 = blue.	9			
			Solarize 2 (if color value > DMX, invert color) Mod1 = red, Mod2 = green, Mod3 = blue.	10			
			Solarize (if color value < DMX, set color to 0) Mod1 = red, Mod2 = green, Mod3 = blue.	11			
			Solarize 4 (if color value > DMX, set color to 0) Mod1 = red, Mod2 = green, Mod3 = blue.	12			
			DotP and Resample Mod1, Mod2 and Mod3 control resampling.	13			
			Color Cycle (DMX value controls cycle speed) Mod1 = red, Mod2 = green, Mod3 = blue.	14			
			All or Nothing (Color value greater than Mod value, color = 255, else color = 0) Mod1 = red, Mod2 = green, Mod3 = blue.	15			
			Solid Color RGB Mod1 = red, Mod2 = green, Mod3 = blue.	16			
			RGB Invert Mod1 = red to inverted red, Mod2 = green to inverted green, Mod3 = blue to inverted blue	17			
			RGB Invert & Swap to GBR Mod1 = red to inverted green, Mod2 = green to inverted blue, Mod3 = blue to inverted red	18			
			RGB Invert & Swap to BRG Mod1 = red to inverted blue, Mod2 = green to inverted red, Mod3 = blue to inverted green	19			
			Edge Detect Color. Mod1=horizontal size, Mod2= vertical search size, Mod3=comparison threshold	20			
			Edge Detect B/W Mod1=horizontal size, Mod2 = vertical search size, Mod3=comparison threshold	21			

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
110	89	**Effect Mode 1**	Texture Ripple, Horizontal Mod1=size, Mod2=rate, Mod3=offset	22	NA	0	0
			Texture Ripple, Vertical Mod1=size, Mod2=rate, Mod3=offset	23			
			Texture Ripple, Circular Mod1=size, Mod2=rate, Mod3=offset	24			
			Texture Ripple, Asymmetrical Circular Mod1=size, Mod2=rate, Mod3=offset	25			
			Chromakey Fine. Select key color using Mod1=red, Mod2 =green, Mod3 =blue	26			
			Chromakey Medium. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	27			
			Chromakey Coarse. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	28			
			Chromakey Inverse, Fine. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	29			
			Chromakey Inverse, Medium. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	30			
			Chromakey Inverse, Coarse. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	31			
			Scan Line: Mod1 selects scan line as texture, Mod2 fades from original image to converted image, Mod3 not used, reserved	32			
			Transparent Wipes: Mod1 =width of transparent area, Mod2 =center of transparent area, Mod3=transparency mode	33			
			Pixel Twist Mod1 = x twist center, Mod2 = y twist center, Mod3 =direction and amount of twist	34			
			Picture-in-Picture. Mod1= x subpicture center, Mod2 = y subpicture center, Mod3= subpicture size	35			
			Magnifying Lens. Mod1 =x lens center, Mod2 =y lens center, Mod3=lens size	36			
			Magnifying Lens 2. Mod1= x lens center, Mod2 = y lens center, Mod3 = lens size	37			
			Cartoon Edge. Mod1 = Edge Color, Mod2= Contrast, Mod3= Edge detection sensitivity	38			
			Color DeConverge. Mod1= Moves red up, Mod2= Moves green down and right, Mod3= Moves blue down and left	39			
			Horizontal Mirror, Mod1 = mirror center, Mod2 and Mod3 not used	40			
			RGB Swap to BGR Mod1 = red, Mod2 = green, Mod3 = blue	41			
			RGB Swap to RBG Mod1 = red, Mod2 = green, Mod3 = blue	42			
			RGB Swap to GRB Mod1 = red, Mod2 = green, Mod3 = blue	43			

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
110	89	**Effect Mode 1**	Colorize Gray Scale maps pixel intensity to color: Mod1 = Color Scheme selection, Mod2 = Zero intensity point in color scheme, Mod3 = Fading	44	NA	0	0
			Intensity key turns pixels of selected intensity transparent: Mod1= Color Scheme, Mod2= Intensity bandwidth, Mod3 = Transparency level	45			
			Raindrop effect. Mod1 controls size/speed, Mod2 seeds the random number generator, and Mod3 controls raindrop rate.	46			
			Scale RGB. Mod1= scale red, Mod2=scale green, Mod3=scale blue. Maximum of Mod1, Mod2 and Mod3 sets overall color range	47			
			Tiling On (Scaler of 128=1 to 1) *Note: Tiling on Mode 1 overrides tiling on Effect Mode 2* Mod1=x-axis tiling scaler, Mod2=y-axis tiling scaler. Mod3 not used.	48			
			Color to Alpha. Mod1 = red to alpha, Mod2 = green to alpha, Mod3 = blue to alpha	49			
			Color to Alpha, Inverted. Mod1 = inverted red to alpha, Mod2 = inverted green to alpha, Mod3 = inverted blue to alpha	50			
			Texture Mixing. Mod1= Source media file, Mod2= Source effect level, Mod3= Crossfade from original to source texture	51			
			Image Scale and Rotate. Mod1=scales image, Mod2= rotation angle, Mod3=rotation speed	52			
			Film Roll. Mod1=horizontal roll speed, Mod2=vertical roll speed, Mod3=Image scale	53			
			Pixelate. Mod1=Amount of pixelation, Mod2=horizontal scaler, Mod3=vertical scaler	54			
			Faux LED. Mod1 = ”LED” size, Mod2 = spacing, Mod 3 = color peaking	55			
			Faux Tile. Mod1 = Tile size, Mod2 = spacing, Mod 3 = color peaking	56			
			Fuzzifier. Mod1 = Horizontal distance, Mod2 = vertical distance, Mod3 = fuzz decay	57			
			Drop Shadow. Mod1 = horizontal shadow size, Mod2 = vertical shadow size, Mod3 = shadow opacity	58			
			Zoom Blur. Mod1 = horizontal position center, Mod2 = vertical position center, Mod3 = zoom	59			
			Chroma Shift. Mod1 = horizontal shift, Mod2 = vertical shift, Mod3 = Scale	60			
			ShakeNBake. Mod1 = horizontal shake, Mod2 = vertical shift, Mod3 = Scale	61			
			Slats, Vertical. Mod1 = number, Mod2 = displacement, Mod3 = fade	62			
			Slats, Horizontal. Mod1 = number, Mod2 = displacement, Mod3 = fade	63			
			Sinewave, Circular with Y-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	64			

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
110	89	**Effect Mode 1**	Sinewave, Circular with Y-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	65	NA	0	0
			Sinewave, Circular with Z-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	66			
			Sinewave, Horizontal with X-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	67			
			Sinewave, Horizontal with Y-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	68			
			Sinewave, Horizontal with Z-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	69			
			Sinewave, Vertical with X-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	70			
			Sinewave, Vertical with Y-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	71			
			Sinewave, Vertical with Z-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	72			
			Glow: Mod1 =red, Mod2 = green, Mod3 =blue	73			
			Glow Color Cycle: Mod1= red cycle speed, Mod2= green cycle speed, Mod3= blue cycle speed	74			
			Reserved, defaults to Effect 0	75-79			
			Downward Vertical Streaks. Mod1 = start position, Mod2 = streak angle, Mod3 = fade	80			
			Gaussian Blur. Mod1 = sample distance, Mod2 = filter pass number, Mod3 = curve shape	81			
			Sharpen. Mod1 = sample distance, Mod2 = filter pass number, Mod3 = sharpen scale	82			
			Reserved. Defaults to effect mode = 0	83-252			
			Spherical mapping control 1. Mod 1= projector y-offset, Mod2=sphere y-offset, Mod3=vertical size. (Defaults to 0 and is ignored unless Spherical Mapping is selected as a Global Effect option)	253			
			Spherical mapping control 2. Mod 1= vertical bend correction, Mod2=vertical bend correction center, Mod3=horizontal size adjustment. (Defaults to 0 and is ignored unless Spherical Mapping is selected as a Global Effect option)	254			
			Pan and Scan. Mod1 = horizontal position, Mod2 = vertical position, Mod3 = Zoom	255			
111	90	**Effect Mode 1 Modifier 1**	These Modifier parameters adjust the option selected in Channel 110 for DL.2 fixtures or Channel 89 for Axon Media Servers. The type of adjustment and the default value depends on the particular effect. NOTE: Setting the Graphic Effect Mode DMX= 253 or 254 activates specific spherical mapping control options for Modifier parameters. For more about Modifier parameter functionality, see *Effect 1 Mode and Effect 2 Mode on page 78*, and specific effect options listed alphabetically in *Chapter 12*.	0-255	0-100	NA	NA
112	91	**Effect Mode 1 Modifier 2**		0-255	0-100		
113	92	**Effect Mode 1 Modifier 3**		0-255	0-100		

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
114	93	**Effect Mode 2**	Off, no effects selection	0	0	0	0
			CMY simulates CMY by subtracting RGB (reduces color values) Mod1 = cyan, Mod2 = magenta, Mod3 = yellow	1	NA		
			CMY Add to All Pixels increases color values. Mod1 = cyan, Mod2 = magenta, Mod3 = yellow	2			
			CMY Add to Non-black Pixels increases color values. Mod1 = cyan, Mod2 = magenta, Mod3 = yellow	3			
			RGB Add All Pixels. Mod1 = red, Mod2 = green, Mod3 = blue	4			
			RGB Add 2 All Pixels. Mod1 = red, Mod2 = green, Mod3 = blue	5			
			RGB Add, non-black pixels. Mod1 = red, Mod2 = green, Mod3 = blue	6			
			RGB Swap to GBR Mod1 = red, Mod2 = green, Mod3 = blue.	7			
			RGB Swap to BGR Mod1 = red, Mod2 = green, Mod3 = blue.	8			
			Solarize 1 (if color value < DMX value, invert color) Mod1 = red, Mod2 = green, Mod3 = blue.	9			
			Solarize 2 (if color value > DMX, invert color) Mod1 = red, Mod2 = green, Mod3 = blue.	10			
			Solarize (if color value < DMX, set color to 0) Mod1 = red, Mod2 = green, Mod3 = blue.	11			
			Solarize 4 (if color value > DMX, set color to 0) Mod1 = red, Mod2 = green, Mod3 = blue.	12			
			DotP and Resample Mod1, Mod2 and Mod3 control resampling.	13			
			Color Cycle (DMX value controls cycle speed) Mod1 = red, Mod2 = green, Mod3 = blue.	14			
			All or Nothing (Color value greater than Mod value, color = 255, else color = 0) Mod1 = red, Mod2 = green, Mod3 = blue.	15			
			Solid Color RGB Mod1 = red, Mod2 = green, Mod3 = blue.	16			
			RGB Invert Mod1 = red to inverted red, Mod2 = green to inverted green, Mod3 = blue to inverted blue	17			
			RGB Invert & Swap to GBR Mod1 = red to inverted green, Mod2 = green to inverted blue, Mod3 = blue to inverted red	18			
			RGB Invert & Swap to BRG Mod1 = red to inverted blue, Mod2 = green to inverted red, Mod3 = blue to inverted green	19			
			Edge Detect Color. Mod1=horizontal size, Mod2 = vertical search size, Mod3=comparison threshold	20			
			Edge Detect B/W Mod1=horizontal size, Mod2 = vertical search size, Mod3=comparison threshold	21			

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
114	93	**Effect Mode 2**	Texture Ripple, Horizontal Mod1=size, Mod2=rate, Mod3=offset	22	NA	0	0
			Texture Ripple, Vertical Mod1=size, Mod2=rate, Mod3=offset	23			
			Texture Ripple, Circular Mod1=size, Mod2=rate, Mod3=offset	24			
			Texture Ripple, Asymmetrical Circular Mod1=size, Mod2=rate, Mod3=offset	25			
			Chromakey Fine. Select key color using Mod1=red, Mod2 =green, Mod3 =blue	26			
			Chromakey Medium. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	27			
			Chromakey Coarse. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	28			
			Chromakey Inverse, Fine. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	29			
			Chromakey Inverse, Medium. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	30			
			Chromakey Inverse, Coarse. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	31			
			Scan Line: Mod1 selects scan line as texture, Mod2 fades from original image to converted image, Mod3 not used, reserved	32			
			Transparent Wipes: Mod1 =width of transparent area, Mod2 =center of transparent area, Mod3=transparency mode	33			
			Pixel Twist. Mod1 = x twist center, Mod2 = y twist center, Mod3 =direction and amount of twist	34			
			Picture-in-Picture. Mod1= x subpicture center, Mod2 = y subpicture center, Mod3= subpicture size	35			
			Magnifying Lens. Mod1 =x lens center, Mod2 =y lens center, Mod3=lens size	36			
			Magnifying Lens 2. Mod1= x lens center, Mod2 = y lens center, Mod3 = lens size	37			
			Cartoon Edge. Mod1 = Edge Color, Mod2= Contrast, Mod3= Edge detection sensitivity	38			
			Color DeConverge Mod1= Moves red up, Mod2 = Moves green down and right, Mod3 = Moves blue down and left	39			
			RGB Swap to BGR Mod1 = red, Mod2 = green, Mod3 = blue	41			
			Horizontal Mirror, Mod1 = mirror center, Mod2 and Mod3 not used	40			
			RGB Swap to RBG Mod1 = red, Mod2 = green, Mod3 = blue	42			
			RGB Swap to GRB Mod1 = red, Mod2 = green, Mod3 = blue	43			

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
114	93	**Effect Mode 2**	Colorize Gray Scale maps pixel intensity to color: Mod1 = Color Scheme selection, Mod2 = Zero intensity point in color scheme, Mod3 = Fading	44	NA	0	0
			Intensity key turns pixels of selected intensity transparent: Mod1= Color Scheme, Mod2= Intensity bandwidth, Mod3 = Transparency level	45			
			Raindrop effect. Mod1 controls size/speed, Mod2 seeds the random number generator, and Mod3 controls raindrop rate.	46			
			Scale RGB. Mod1= scale red, Mod2=scale green, Mod3=scale blue. Maximum of Mod1, Mod2 and Mod3 sets overall color range	47			
			Tiling On (Scaler of 128=1 to 1) *Note: Tiling on Mode 1 overrides tiling on Effect Mode 2* Mod1=x-axis tiling scaler, Mod2=y-axis tiling scaler. Mod3 not used.	48			
			Color to Alpha. Mod1 = red to alpha, Mod2 = green to alpha, Mod3 = blue to alpha	49			
			Color to Alpha, Inverted. Mod1 = inverted red to alpha, Mod2 = inverted green to alpha, Mod3 = inverted blue to alpha	50			
			Texture Mixing. Mod1= Source media file, Mod2= Source effect level, Mod3= Crossfade from original to source texture	51			
			Image Scale and Rotate. Mod1=scales image, Mod2= rotation angle, Mod3=rotation speed	52			
			Film Roll. Mod1=horizontal roll speed, Mod2=vertical roll speed, Mod3=Image scale	53			
			Pixelate. Mod1=Amount of pixelation, Mod2=horizontal scaler, Mod3=vertical scaler	54			
			Faux LED. Mod1 = ”LED” size, Mod2 = spacing, Mod 3 = color peaking	55			
			Faux Tile. Mod1 = Tile size, Mod2 = spacing, Mod 3 = color peaking	56			
			Fuzzifier. Mod1 = Horizontal distance, Mod2 = vertical distance, Mod3 = fuzz decay	57			
			Drop Shadow. Mod1 = horizontal shadow size, Mod2 = vertical shadow size, Mod3 = shadow opacity	58			
			Zoom Blur. Mod1 = horizontal position center, Mod2 = vertical position center, Mod3 = zoom	59			
			Chroma Shift. Mod1 = horizontal shift, Mod2 = vertical shift, Mod3 = Scale	60			
			ShakeNBake. Mod1 = horizontal shake, Mod2 = vertical shift, Mod3 = Scale	61			
			Slats, Vertical. Mod1 = number, Mod2 = displacement, Mod3 = fade	62			
			Slats, Horizontal. Mod1 = number, Mod2 = displacement, Mod3 = fade	63			
			Sinewave, Circular with Y-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	64			

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
114	93	**Effect Mode 2**	Sinewave, Circular with Y-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	65	NA	0	0
			Sinewave, Circular with Z-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	66			
			Sinewave, Horizontal with X-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	67			
			Sinewave, Horizontal with Y-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	68			
			Sinewave, Horizontal with Z-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	69			
			Sinewave, Vertical with X-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	70			
			Sinewave, Vertical with Y-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	71			
			Sinewave, Vertical with Z-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	72			
			Glow: Mod1 =red, Mod2 = green, Mod3 =blue	73			
			Glow Color Cycle: Mod1= red cycle speed, Mod2= green cycle speed, Mod3= blue cycle speed	74			
			Reserved, defaults to Effect 0	75-79			
			Downward Vertical Streaks. Mod1 = start position, Mod2 = streak angle, Mod3 = fade	80			
			Gaussian Blur. Mod1 = sample distance, Mod2 = filter pass number, Mod3 = curve shape	81			
			Sharpen. Mod1 = sample distance, Mod2 = filter pass number, Mod3 = sharpen scale	82			
			Reserved. Defaults to effect mode = 0	83-252			
			Spherical mapping control 1. Mod 1= projector y-offset, Mod2=sphere y-offset, Mod3=vertical size. (Defaults to 0 and is ignored unless Spherical Mapping is selected as a Global Effect option)	253			
			Spherical mapping control 2. Mod 1= vertical bend correction, Mod2=vertical bend correction center, Mod3=horizontal size adjustment. (Defaults to 0 and is ignored unless Spherical Mapping is selected as a Global Effect option)	254			
			Pan and Scan. Mod1 = horizontal position, Mod2 = vertical position, Mod3 = Zoom	255			
115	94	**Effect Mode 2 Modifier 1**	These Modifier parameters adjust the option selected in Channel 114 for DL.2 fixtures or Channel 93 for Axon Media Servers. The type of adjustment and the default value depends on the particular effect. NOTE: Setting the Graphic Effect Mode DMX= 253 or 254 activates specific spherical mapping control options for Modifier parameters. For more about Modifier parameter functionality, see *Effect 1 Mode and Effect 2 Mode on page 78*, and specific effect options listed alphabetically in *Chapter 12*.	0-255	0-100	NA	NA
116	95	**Effect Mode 2 Modifier 2**		0-255	0-100		
117	96	**Effect Mode 2 Modifier 3**		0-255	0-100		

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
Graphic 2 Rotation							
118 119	97 98	**X-axis Rotation** **(vertical flip, 16-bit adjustment)**	Continuous variable-speed counterclockwise object rotation around X-axis (fast to slow)	0-16382	0-24	32768	50
			Continuous rotation stop	16383	25		
			Rotates the object counterclockwise around X-axis in steps to -720 degrees absolute	16384-32767	26-49		
			0° rotation around X-axis	32768	50		
			Rotates the object clockwise around X-axis in steps to 720 degrees absolute	32769-49151	51-74		
			Continuous rotation stop	49152	75		
			Continuous variable-speed clockwise object rotation around X-axis (slow to fast)	49154-65535	76-100		
120 121	99 100	**Y-axis Rotation** **(horizontal flip, 16-bit adjustment)**	Continuous variable-speed counterclockwise object rotation around Y-axis (fast to slow)	0-16382	0-24	32768	50
			Continuous rotation stop	16383	25		
			Rotates the object counterclockwise around Y-axis in steps to -720 degrees absolute	16384-32767	26-49		
			0° rotation around Y-axis	32768	50		
			Rotates the object clockwise around Y-axis in steps to 720 degrees absolute	32769-49151	51-74		
			Continuous rotation stop	49152	75		
			Continuous variable-speed clockwise object rotation around Y-axis (slow to fast)	49154-65535	76-100		
122 123	101 102	**Z-axis Rotation** **(circular 16-bit adjustment)**	Continuous variable-speed counterclockwise object rotation around Z axis (fast to slow)	0-16382	0-24	32768	50
			Continuous rotation stop	16383	25		
			Rotates the object counterclockwise around Z-axis in steps to -720 degrees absolute	16384-32767	26-49		
			0° rotation around Z-axis	32768	50		
			Rotates the object clockwise around Z-axis in steps to 720 degrees absolute	32769-49151	51-74		
			Continuous rotation stop	49152	75		
			Continuous variable-speed clockwise object rotation around Z axis (slow to fast)	49154-65535	76-100		

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
Graphic 2 Scaling							
124	103	**Scale X**	Minimum object size along X axis (1:10)	0	0	128	50
			Increases object size along X axis from minimum to actual size	1-127	1-49		
			Actual size along X axis (1:1)	128	50		
			Increases object size along X axis from actual to maximum size	129-254	51-99		
			Maximum object size along X axis (10:1)	255	100		
125	104	**Scale Y**	Minimum object size along Y axis (1:10)	0	0	128	50
			Increases object size along Y axis from minimum to actual size	1-127	1-49		
			Actual size along Y axis (1:1)	128	50		
			Increases object size along Y axis from actual to maximum size	129-254	51-99		
			Maximum object size along Y axis (10:1)	255	100		
126	105	**Scale Z**	Minimum object size along Z axis (1:10)	0	0	128	50
			Increases object size along Z axis from minimum to actual size	1-127	1-49		
			Actual size along Z axis (1:1)	128	50		
			Increases object size along Z axis from actual to maximum size	129-254	51-99		
			Maximum object size along Z axis (10:1)	255	100		
Graphic 2 Position							
127	106	**X-Position**	Moves object left from center of display	0-36767	0-49	32768	50
			Centers object along X axis in display	32768	50		
128	107		Moves object right from center of display	36769-65535	51-100		
129	108	**Y-Position**	Moves object down from center of display	0-36767	0-49	32768	50
			Centers object along Y axis in display	32768	50		
130	109		Moves object up from center of display	36769-65535	51-100		
131	110	**Z-Position**	Moves object nearer from center of display	0-36767	0-49	32768	50
			Centers object along Z axis in display	32768	50		
132	111		Moves object back along Z axis at center of display	36769-65535	51-100		

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
Graphic 3 Function (Standard Protocol)							
133	112	**Opacity**	Selects transparency level from completely transparent (0) to opaque (255)	0-255	0-100	0	0
Graphic 3 Content Definition							
134	113	**3-D Object File**	No selection	0	0	1	1
			First Stock 3-D Object (flat plane)	1	1		
			Additional Stock 3-D Objects	2-149	NA		
			First User 3-D Objects	150			
			Additional User Objects	151-255			
135	114	**Media Folder**	No selection	0	NA	0	0
			HES Folder 1	1			
			HES folder 2- 40	2-40			
			First User folder 41	41			
			User Folders 42-239	42-239			
			Reserved	240-254			
			Integrated video camera capture. The Media File parameter is ignored	255			
136	115	**Media File**	No selection	0	0	0	0
			First Media File	1	NA		
			Additional Media Files 2-255	2-255			
137 138	116 117	**In Frame**	Defines the beginning of a Media File segment as a percentage of the movie length	0-65535	0-100	0	0
139 140	118 119	**Out Frame**	Defines the end of a Media File segment as a percentage of the movie length	0-65535	0-100	65535	100
141	120	**Play Mode**	Play forward looping continuously	0	0	0	0
			Play forward once and hold on the last frame	1	NA		
			Pause	2			
			Play forward if opacity > 0, hold on last frame	3			
			Play forward if opacity > 0, looping continuously	4			
			Pause and rewind to In Frame	5			
			Scrub (Display) the selected In Frame	6			
			Scrub (Display) the selected Out Frame	7			
			Scrub (Display) the selected In Frame with statistics	8			
			Scrub (Display) the selected Out Frame with statistics	9			
			Reserved	10-255			
142	121	**Play Speed**	Normal Speed	0	0	128	50
			Slow speeds from slowest toward normal	1-127	1-49		
			Normal Speed	128	50		
			Faster than Normal to Fastest	129-255	51-100		

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
Graphic 3 Synchronization							
143	122	**Sync Mode**	No selection	0	0	0	0
			Sync to Graphic 1 movie time	1	NA		
			Sync to Graphic 2 movie time	2			
			Sync to Graphic 3 movie time	3			
			Sync to Object rotation 1	4			
			Sync to Object rotation 2	5			
			Sync to Object rotation 3	6			
			Sync to reverse Object rotation 1	7			
			Sync to reverse Object rotation 2	8			
			Sync to reverse Object rotation 3	9			
			Sync to Graphic movie time and rotation 1	10			
			Sync to Graphic movie time and rotation 2	11			
			Sync to Graphic movie time and rotation 3	12			
			Sync to Graphic movie time + reverse rotation 1	13			
			Sync to Graphic movie time + reverse rotation 2	14			
			Sync to Graphic movie time + reverse rotation 3	15			
			Reserved. Defaults to mode 0, no selection.	16- 255			
144	123	**Sync To**	No Selection	0	NA	0	0
			Sync to Fixture ID Number 1	1			
			Sync to Fixture ID Number 2 . . .	2 . . .			
			Sync to Fixture Number 254	254			
			Sync to Fixture ID Number 255	255			
Graphic 3 Effects							
145	124	**Visual Mode**	Off. No visual mode processing applied to output.	0	NA	1	1
			Content Optimization Mod1=black level, Mod2=contrast.	1			
			Sepia tones. Mod1 fades from original color to sepia colors. Mod2 controls saturation.	2			
			Red tones. Mod1 fades from original color to red tones. Mod2 controls saturation.	3			
			Gray maker. Mod1 compresses colors to shades of gray. Mod2 adjusts contrast	4			
			Gray maker2. Always gray. Mod1 = brightness, Mod2 = contrast	5			
			Posterizer. Mod1 reduces color detail. Mod2 adjusts contrast.	6			
			Color to Black & White. Mod1 fades color RGB @0 to B/W @50% to white @100%. Mod2= not used.	7			
			Fire Gradient, Mod1fades original to converted Mod2 not used, reserved.	8			

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
145	124	**Visual Mode**	Negative Art. Mod1 fades from original image to converted image, Mod2 subtracts red from 0-128, subtracts green from 129-255.	9	NA	1	1
			Exposure Control. Mod1 adjusts color contrast, Mod2 adjusts color shift	10			
			Invert B&W, Keep Color. Mod1 = black comparison level, Mod2= white comparison level	11			
			Texture Mixing. Mod1= Source media file, Mod2= Crossfade from original to source texture	12			
			Image Scale and Rotate. Mod1=image scale, Mod2=rotation angle.	13			
			Film Roll. Mod1=horizontal roll speed, Mod2=Vertical roll speed	14			
			Pixelate. Mod1 = amount of pixelation, Mod 2 not used	15			
			Faux LED. Mod1 = ”LED” size, Mod2 = spacing	16			
			Faux Tile. Mod1 = Tile size, Mod2 = spacing	17			
			Fuzzifier. Mod1 = x-axis distance, Mod2 = y-axis distance	18			
			Drop Shadow. Mod1 = horizontal shadow size, Mod2 = vertical shadow size	19			
			Zoom Blur. Mod1 = horizontal position center, Mod2 = vertical position center	20			
			Chroma Shift. Mod1 = horizontal shift, Mod2 = vertical shift	21			
			ShakeNBake. Mod1 = horizontal shake, Mod2 = vertical shift	22			
			Reserved (Defaults to 0)	19-254			
			Pan and Scan. Mod1 = horizontal position, Mod2 = vertical position	255			
146	125	**Visual Mode Modifier 1**	Adjusts option selected in Channel 145 for DL.2 fixtures or Channel 124 for Axon Media Servers. The type of adjustment and the default value depends on the particular visual mode option. For more about Modifier parameter functionality, see, *Visual Mode on page 58* and *Visual Mode Options on page 60*.	0-255	0-100	NA	NA
147	126	**Visual Mode Modifier 2**		0-255	0-100		

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
148	127	**Effect Mode 1**	Off, no effects selection	0	0	0	0
			CMY simulates CMY by subtracting RGB (reduces color values) Mod1 = cyan, Mod2 = magenta, Mod3 = yellow	1	NA		
			CMY Add to All Pixels increases color values. Mod1 = cyan, Mod2 = magenta, Mod3 = yellow	2			
			CMY Add to Non-black Pixels increases color values. Mod1 = cyan, Mod2 = magenta, Mod3 = yellow	3			
			RGB Add All Pixels. Mod1 = red, Mod2 = green, Mod3 = blue	4			
			RGB Add 2 All Pixels. Mod1 = red, Mod2 = green, Mod3 = blue	5			
			RGB Add, non-black pixels. Mod1 = red, Mod2 = green, Mod3 = blue	6			
			RGB Swap to GBR Mod1 = red, Mod2 = green, Mod3 = blue.	7			
			RGB Swap to BGR Mod1 = red, Mod2 = green, Mod3 = blue.	8			
			Solarize 1 (if color value < DMX value, invert color) Mod1 = red, Mod2 = green, Mod3 = blue.	9			
			Solarize 2 (if color value > DMX, invert color) Mod1 = red, Mod2 = green, Mod3 = blue.	10			
			Solarize (if color value < DMX, set color to 0) Mod1 = red, Mod2 = green, Mod3 = blue.	11			
			Solarize 4 (if color value > DMX, set color to 0) Mod1 = red, Mod2 = green, Mod3 = blue.	12			
			DotP and Resample Mod1, Mod2 and Mod3 control resampling.	13			
			Color Cycle (DMX value controls cycle speed) Mod1 = red, Mod2 = green, Mod3 = blue.	14			
			All or Nothing (Color value greater than Mod value, color = 255, else color = 0) Mod1 = red, Mod2 = green, Mod3 = blue.	15			
			Solid Color RGB Mod1 = red, Mod2 = green, Mod3 = blue.	16			
			RGB Invert Mod1 = red to inverted red, Mod2 = green to inverted green, Mod3 = blue to inverted blue	17			
			RGB Invert & Swap to GBR Mod1 = red to inverted green, Mod2 = green to inverted blue, Mod3 = blue to inverted red	18			
			RGB Invert & Swap to BRG Mod1 = red to inverted blue, Mod2 = green to inverted red, Mod3 = blue to inverted green	19			
			Edge Detect Color. Mod1=horizontal size, Mod2 = vertical search size, Mod3=comparison threshold	20			
			Edge Detect B/W Mod1=horizontal size, Mod2 = vertical search size, Mod3=comparison threshold	21			

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
148	127	**Effect Mode 1**	Texture Ripple, Horizontal Mod1=size, Mod2=rate, Mod3=offset	22	NA	0	0
			Texture Ripple, Vertical Mod1=size, Mod2=rate, Mod3=offset	23			
			Texture Ripple, Circular Mod1=size, Mod2=rate, Mod3=offset	24			
			Texture Ripple, Asymmetrical Circular Mod1=size, Mod2=rate, Mod3=offset	25			
			Chromakey Fine. Select key color using Mod1=red, Mod2 =green, Mod3 =blue	26			
			Chromakey Medium. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	27			
			Chromakey Coarse. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	28			
			Chromakey Inverse, Fine. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	29			
			Chromakey Inverse, Medium. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	30			
			Chromakey Inverse, Coarse. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	31			
			Scan Line: Mod1 selects scan line as texture, Mod2 fades from original image to converted image, Mod3 not used, reserved	32			
			Transparent Wipes: Mod1 =width of transparent area, Mod2 =center of transparent area, Mod3=transparency mode	33			
			Pixel Twist. Mod1 = x twist center, Mod2 = y twist center, Mod3 =direction and amount of twist	34			
			Picture-in-Picture. Mod1= x subpicture center, Mod2 = y subpicture center, Mod3= subpicture size	35			
			Magnifying Lens. Mod1 =x lens center, Mod2= y lens center, Mod3=lens size	36			
			Magnifying Lens 2. Mod1= x lens center, Mod2= y lens center, Mod3 = lens size	37			
			Cartoon Edge. Mod1 = Edge Color, Mod2= Contrast, Mod3= Edge detection sensitivity	38			
			Color DeConverge . Mod1= Moves red up, Mod2= Moves green down and right, Mod3 = Moves blue down and left	39			
			Horizontal Mirror, Mod1 = mirror center, Mod2 and Mod3 not used	40			
			RGB Swap to BGR Mod1 = red, Mod2 = green, Mod3 = blue	41			
			RGB Swap to RBG Mod1 = red, Mod2 = green, Mod3 = blue	42			
			RGB Swap to GRB Mod1 = red, Mod2 = green, Mod3 = blue	43			

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
148	127	**Effect Mode 1**	Colorize Gray Scale maps pixel intensity to color: Mod1 = Color Scheme selection, Mod2 = Zero intensity point in color scheme, Mod3 = Fading	44	NA	0	0
			Intensity key turns pixels of selected intensity transparent: Mod1= Color Scheme, Mod2= Intensity bandwidth, Mod3 = Transparency level	45			
			Raindrop effect. Mod1 controls size/speed, Mod2 seeds the random number generator, and Mod3 controls raindrop rate.	46			
			Scale RGB. Mod1= scale red, Mod2=scale green, Mod3=scale blue. Maximum of Mod1, Mod2 and Mod3 sets overall color range	47			
			Tiling On (Scaler of 128=1 to 1) *Note: Tiling on Mode 1 overrides tiling on Effect Mode 2* Mod1=x-axis tiling scaler, Mod2=y-axis tiling scaler. Mod3 not used.	48			
			Color to Alpha. Mod1 = red to alpha, Mod2 = green to alpha, Mod3 = blue to alpha	49			
			Color to Alpha, Inverted. Mod1 = inverted red to alpha, Mod2 = inverted green to alpha, Mod3 = inverted blue to alpha	50			
			Texture Mixing. Mod1= Source media file, Mod2= Source effect level, Mod3= Crossfade from original to source texture	51			
			Image Scale and Rotate. Mod1=scales image, Mod2= rotation angle, Mod3=rotation speed	52			
			Film Roll. Mod1=horizontal roll speed, Mod2=vertical roll speed, Mod3=Image scale	53			
			Pixelate. Mod1=Amount of pixelation, Mod2=horizontal scaler, Mod3=vertical scaler	54			
			Faux LED. Mod1 = ”LED” size, Mod2 = spacing, Mod 3 = color peaking	55			
			Faux Tile. Mod1 = Tile size, Mod2 = spacing, Mod 3 = color peaking	56			
			Fuzzifier. Mod1 = Horizontal distance, Mod2 = vertical distance, Mod3 = fuzz decay	57			
			Drop Shadow. Mod1 = horizontal shadow size, Mod2 = vertical shadow size, Mod3 = shadow opacity	58			
			Zoom Blur. Mod1 = horizontal position center, Mod2 = vertical position center, Mod3 = zoom	59			
			Chroma Shift. Mod1 = horizontal shift, Mod2 = vertical shift, Mod3 = Scale	60			
			ShakeNBake. Mod1 = horizontal shake, Mod2 = vertical shift, Mod3 = Scale	61			
			Slats, Vertical. Mod1 = number, Mod2 = displacement, Mod3 = fade	62			
			Slats, Horizontal. Mod1 = number, Mod2 = displacement, Mod3 = fade	63			
			Sinewave, Circular with Y-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	64			

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
148	127	**Effect Mode 1**	Sinewave, Circular with Y-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	65	NA	0	0
			Sinewave, Circular with Z-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	66			
			Sinewave, Horizontal with X-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	67			
			Sinewave, Horizontal with Y-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	68			
			Sinewave, Horizontal with Z-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	69			
			Sinewave, Vertical with X-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	70			
			Sinewave, Vertical with Y-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	71			
			Sinewave, Vertical with Z-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	72			
			Glow: Mod1 =red, Mod2 = green, Mod3 =blue	73			
			Glow Color Cycle: Mod1= red cycle speed, Mod2= green cycle speed, Mod3= blue cycle speed	74			
			Reserved, defaults to Effect 0	75-79			
			Downward Vertical Streaks. Mod1 = start position, Mod2 = streak angle, Mod3 = fade	80			
			Gaussian Blur. Mod1 = sample distance, Mod2 = filter pass number, Mod3 = curve shape	81			
			Sharpen. Mod1 = sample distance, Mod2 = filter pass number, Mod3 = sharpen scale	82			
			Reserved. Defaults to effect mode = 0	83-252			
			Spherical mapping control 1. Mod 1= projector y-offset, Mod2=sphere y-offset, Mod3=vertical size. (Defaults to 0 and is ignored unless Spherical Mapping is selected as a Global Effect option)	253			
			Spherical mapping control 2. Mod 1= vertical bend correction, Mod2=vertical bend correction center, Mod3=horizontal size adjustment. (Defaults to 0 and is ignored unless Spherical Mapping is selected as a Global Effect option)	254			
			Pan and Scan. Mod1 = horizontal position, Mod2 = vertical position, Mod3 = Zoom	255			
149	128	**Effect Mode 1 Modifier 1**	These Modifier parameters adjust the option selected in Channel 148 for DL.2 fixtures or Channel 127 for Axon Media Servers. The type of adjustment and the default value depends on the particular effect. NOTE: Setting the Graphic Effect Mode DMX= 253 or 254 activates specific spherical mapping control options for Modifier parameters. For more about Modifier parameter functionality, see *Effect 1 Mode and Effect 2 Mode on page 78*, and specific effect options listed alphabetically in *Chapter 12.*	0-255	0-100		
150	129	**Effect Mode 1 Modifier 2**		0-255	0-100		
151	130	**Effect Mode 1 Modifier 3**		0-255	0-100		

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
152	131	**Effect Mode 2**	Off, no effects selection	0	0	0	0
			CMY simulates CMY by subtracting RGB (reduces color values) Mod1 = cyan, Mod2 = magenta, Mod3 = yellow	1	NA		
			CMY Add to All Pixels increases color values. Mod1 = cyan, Mod2 = magenta, Mod3 = yellow	2			
			CMY Add to Non-black Pixels increases color values. Mod1 = cyan, Mod2 = magenta, Mod3 = yellow	3			
			RGB Add All Pixels. Mod1 = red, Mod2 = green, Mod3 = blue	4			
			RGB Add 2 All Pixels. Mod1 = red, Mod2 = green, Mod3 = blue	5			
			RGB Add, non-black pixels. Mod1 = red, Mod2 = green, Mod3 = blue	6			
			RGB Swap to GBR Mod1 = red, Mod2 = green, Mod3 = blue.	7			
			RGB Swap to BGR Mod1 = red, Mod2 = green, Mod3 = blue.	8			
			Solarize 1 (if color value < DMX value, invert color) Mod1 = red, Mod2 = green, Mod3 = blue.	9			
			Solarize 2 (if color value > DMX, invert color) Mod1 = red, Mod2 = green, Mod3 = blue.	10			
			Solarize (if color value < DMX, set color to 0) Mod1 = red, Mod2 = green, Mod3 = blue.	11			
			Solarize 4 (if color value > DMX, set color to 0) Mod1 = red, Mod2 = green, Mod3 = blue.	12			
			DotP and Resample Mod1, Mod2 and Mod3 control resampling.	13			
			Color Cycle (DMX value controls cycle speed) Mod1 = red, Mod2 = green, Mod3 = blue.	14			
			All or Nothing (Color value greater than Mod value, color = 255, else color = 0) Mod1 = red, Mod2 = green, Mod3 = blue.	15			
			Solid Color RGB Mod1 = red, Mod2 = green, Mod3 = blue.	16			
			RGB Invert Mod1 = red to inverted red, Mod2 = green to inverted green, Mod3 = blue to inverted blue	17			
			RGB Invert & Swap to GBR Mod1 = red to inverted green, Mod2 = green to inverted blue, Mod3 = blue to inverted red	18			
			RGB Invert & Swap to BRG Mod1 = red to inverted blue, Mod2 = green to inverted red, Mod3 = blue to inverted green	19			
			Edge Detect ColorMod1=horizontal size, Mod2 = vertical search size, Mod3=comparison threshold	20			
			Edge Detect B/W Mod1=horizontal size, Mod2 = vertical search size, Mod3=comparison threshold	21			

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
152	131	**Effect Mode 2**	Texture Ripple, Horizontal Mod1=size, Mod2=rate, Mod3=offset	22	NA	0	0
			Texture Ripple, Vertical Mod1=size, Mod2=rate, Mod3=offset	23			
			Texture Ripple, Circular Mod1=size, Mod2=rate, Mod3=offset	24			
			Texture Ripple, Asymmetrical Circular Mod1=size, Mod2=rate, Mod3=offset	25			
			Chromakey Fine. Select key color using Mod1=red, Mod2 =green, Mod3 =blue	26			
			Chromakey Medium. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	27			
			Chromakey Coarse. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	28			
			Chromakey Inverse, Fine. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	29			
			Chromakey Inverse, Medium. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	30			
			Chromakey Inverse, Coarse. Select key color using Mod1 =red, Mod2 =green, Mod3 =blue	31			
			Scan Line: Mod1 selects scan line as texture, Mod2 fades from original image to converted image, Mod3 not used, reserved	32			
			Transparent Wipes: Mod1 =width of transparent area, Mod2 =center of transparent area, Mod3=transparency mode	33			
			Pixel Twist. Mod1 = x twist center, Mod2 = y twist center, Mod3 =direction and amount of twist	34			
			Picture-in-Picture. Mod1= x subpicture center, Mod2 = y subpicture center, Mod3= subpicture size	35			
			Magnifying Lens. Mod1 =x lens center, Mod2 =y lens center, Mod3=lens size	36			
			Magnifying Lens 2. Mod1= x lens center, Mod2 = y lens center, Mod3 = lens size	37			
			Cartoon Edge. Mod1 = Edge Color, Mod2= Contrast, Mod3= Edge detection sensitivity	38			
			Color DeConverge Mod1= Moves red up, Mod2 = Moves green down and right, Mod3 = Moves blue down and left	39			
			Horizontal Mirror, Mod1 = mirror center, Mod2 and Mod3 not used	40			
			RGB Swap to BGR Mod1 = red, Mod2 = green, Mod3 = blue	41			
			RGB Swap to RBG Mod1 = red, Mod2 = green, Mod3 = blue	42			
			RGB Swap to GRB Mod1 = red, Mod2 = green, Mod3 = blue	43			

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
152	131	**Effect Mode 2**	Colorize Gray Scale maps pixel intensity to color: Mod1 = Color Scheme selection, Mod2 = Zero intensity point in color scheme, Mod3 = Fading	44	NA	0	0
			Intensity key turns pixels of selected intensity transparent: Mod1= Color Scheme, Mod2= Intensity bandwidth, Mod3 = Transparency level	45			
			Raindrop effect. Mod1 controls size/speed, Mod2 seeds the random number generator, and Mod3 controls raindrop rate.	46			
			Scale RGB. Mod1= scale red, Mod2=scale green, Mod3=scale blue. Maximum of Mod1, Mod2 and Mod3 sets overall color range	47			
			Tiling On (Scaler of 128=1 to 1) *Note: Tiling on Mode 1 overrides tiling on Effect Mode 2* Mod1=x-axis tiling scaler, Mod2=y-axis tiling scaler. Mod3 not used.	48			
			Color to Alpha. Mod1 = red to alpha, Mod2 = green to alpha, Mod3 = blue to alpha	49			
			Color to Alpha, Inverted. Mod1 = inverted red to alpha, Mod2 = inverted green to alpha, Mod3 = inverted blue to alpha	50			
			Texture Mixing. Mod1= Source media file, Mod2= Source effect level, Mod3= Crossfade from original to source texture	51			
			Image Scale and Rotate. Mod1=scales image, Mod2= rotation angle, Mod3=rotation speed	52			
			Film Roll. Mod1=horizontal roll speed, Mod2=vertical roll speed, Mod3=Image scale	53			
			Pixelate. Mod1=Amount of pixelation, Mod2=horizontal scaler, Mod3=vertical scaler	54			
			Faux LED. Mod1 = ”LED” size, Mod2 = spacing, Mod 3 = color peaking	55			
			Faux Tile. Mod1 = Tile size, Mod2 = spacing, Mod 3 = color peaking	56			
			Fuzzifier. Mod1 = Horizontal distance, Mod2 = vertical distance, Mod3 = fuzz decay	57			
			Drop Shadow. Mod1 = horizontal shadow size, Mod2 = vertical shadow size, Mod3 = shadow opacity	58			
			Zoom Blur. Mod1 = horizontal position center, Mod2 = vertical position center, Mod3 = zoom	59			
			Chroma Shift. Mod1 = horizontal shift, Mod2 = vertical shift, Mod3 = Scale	60			
			ShakeNBake. Mod1 = horizontal shake, Mod2 = vertical shift, Mod3 = Scale	61			
			Slats, Vertical. Mod1 = number, Mod2 = displacement, Mod3 = fade	62			
			Slats, Horizontal. Mod1 = number, Mod2 = displacement, Mod3 = fade	63			
			Sinewave, Circular with Y-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	64			

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
152	131	**Effect Mode 2**	Sinewave, Circular with Y-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	65	NA	0	0
			Sinewave, Circular with Z-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	66			
			Sinewave, Horizontal with X-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	67			
			Sinewave, Horizontal with Y-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	68			
			Sinewave, Horizontal with Z-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	69			
			Sinewave, Vertical with X-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	70			
			Sinewave, Vertical with Y-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	71			
			Sinewave, Vertical with Z-axis Wobbulation Mod1=size, Mod2=rate, Mod3=offset	72			
			Glow: Mod1 =red, Mod2 = green, Mod3 =blue	73			
			Glow Color Cycle: Mod1= red cycle speed, Mod2= green cycle speed, Mod3= blue cycle speed	74			
			Reserved, defaults to Effect 0	75-79			
			Downward Vertical Streaks. Mod1 = start position, Mod2 = streak angle, Mod3 = fade	80			
			Gaussian Blur. Mod1 = sample distance, Mod2 = filter pass number, Mod3 = curve shape	81			
			Sharpen. Mod1 = sample distance, Mod2 = filter pass number, Mod3 = sharpen scale	82			
			Reserved. Defaults to effect mode = 0	83-252			
			Spherical mapping control 1. Mod 1= projector y-offset, Mod2=sphere y-offset, Mod3=vertical size. (Defaults to 0 and is ignored unless Spherical Mapping is selected as a Global Effect option)	253			
			Spherical mapping control 2. Mod 1= vertical bend correction, Mod2=vertical bend correction center, Mod3=horizontal size adjustment. (Defaults to 0 and is ignored unless Spherical Mapping is selected as a Global Effect option)	254			
			Pan and Scan. Mod1 = horizontal position, Mod2 = vertical position, Mod3 = Zoom	255			

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
153	132	**Effect Mode 2 Modifier 1**	These Modifier parameters adjust the option selected in Channel 153 for DL.2 fixtures or Channel 131 for Axon Media Servers. The type of adjustment and the default value depends on the particular effect. NOTE: Setting the Graphic Effect Mode DMX= 253 or 254 activates specific spherical mapping control options for Modifier parameters. For more about Modifier parameter functionality, see *Effect 1 Mode and Effect 2 Mode on page 78*, and specific effect options listed alphabetically in *Chapter 12*.	0-255	0-100		
154	133	**Effect Mode 2 Modifier 2**		0-255	0-100		
155	134	**Effect Mode 2 Modifier 3**		0-255	0-100		

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
Graphic 3 Rotation							
156 157	135 136	**X-axis Rotation** **(vertical flip, 16-bit adjustment)**	Continuous variable-speed counterclockwise object rotation around X-axis (fast to slow)	0-16382	0-24	32768	50
			Continuous rotation stop	16383	25		
			Rotates the object counterclockwise around X-axis in steps to -720 degrees absolute	16384-32767	26-49		
			0° rotation around X-axis	32768	50		
			Rotates the object clockwise around X-axis in steps to 720 degrees absolute	32769-49151	51-74		
			Continuous rotation stop	49152	75		
			Continuous variable-speed clockwise object rotation around X-axis (slow to fast)	49154-65535	76-100		
158 159	137 138	**Y-axis Rotation** **(horizontal flip, 16-bit adjustment)**	Continuous variable-speed counterclockwise object rotation around Y-axis (fast to slow)	0-16382	0-24	32768	50
			Continuous rotation stop	16383	25		
			Rotates the object counterclockwise around Y-axis in steps to -720 degrees absolute	16384-32767	26-49		
			0° rotation around Y-axis	32768	50		
			Rotates the object clockwise around Y-axis in steps to 720 degrees absolute	32769-49151	51-74		
			Continuous rotation stop	49152	75		
			Continuous variable-speed clockwise object rotation around Y-axis (slow to fast)	49154-65535	76-100		
160 161	139 140	**Z-axis Rotation** **(circular 16-bit adjustment)**	Continuous variable-speed counterclockwise object rotation around Z axis (fast to slow)	0-16382	0-24	32768	50
			Continuous rotation stop	16383	25		
			Rotates the object counterclockwise around Z-axis in steps to -720 degrees absolute	16384-32767	26-49		
			0° rotation around Z-axis	32768	50		
			Rotates the object clockwise around Z-axis in steps to 720 degrees absolute	32769-49151	51-74		
			Continuous rotation stop	49152	75		
			Continuous variable-speed clockwise object rotation around Z axis (slow to fast)	49154-65535	76-100		

Channel #		Function	Description	Value		Default	
DL.2	Axon			dec.	%	dec.	%
Graphic 3 Scaling							
162	141	**Scale X**	Minimum object size along X axis (1:10)	0	0	128	50
			Increases object size along X axis from minimum to actual size	1-127	1-49		
			Actual size along X axis (1:1)	128	50		
			Increases object size along X axis from actual to maximum size	129-254	51-99		
			Maximum object size along X axis (10:1)	255	100		
163	142	**Scale Y**	Minimum object size along Y axis (1:10)	0	0	128	50
			Increases object size along Y axis from minimum to actual size	1-127	1-49		
			Actual size along Y axis (1:1)	128	50		
			Increases object size along Y axis from actual to maximum size	129-254	51-99		
			Maximum object size along Y axis (10:1)	255	100		
164	143	**Scale Z**	Minimum object size along Z axis (1:10)	0	0	128	50
			Increases object size along Z axis from minimum to actual size	1-127	1-49		
			Actual size along Z axis (1:1)	128	50		
			Increases object size along Z axis from actual to maximum size	129-254	51-99		
			Maximum object size along Z axis (10:1)	255	100		
Graphic 3 Position							
165	144	**X-Position**	Moves object left from center of display	0-36767	0-49	32768	50
			Centers object along X axis in display	32768	50		
166	145		Moves object right from center of display	36769-65535	51-100		
167	146	**Y-Position**	Moves object down from center of display	0-36767	0-49	32768	50
			Centers object along Y axis in display	32768	50		
168	147		Moves object up from center of display	36769-65535	51-100		
169	148	**Z-Position**	Moves object nearer from center of display	0-36767	0-49	32768	50
			Centers object along Z axis in display	32768	50		
170	149		Moves object back along Z axis at center of display	36769-65535	51-100		

Appendix B:

Custom User Content

There are several considerations to keep in mind when creating custom content to control with the DL.2 graphics engine software.

Preparing Custom Content

For the highest quality rendering and playback on a DL.2 fixture or Axon media server, use the following steps:

1. Commission or Design High Quality (Visually Clean or Never-Compressed) Video, at least 640 x 480 in Photo Jpeg 98%-100% or Animation Non Compressed (best) format.

   Note: Extracting footage from a playable DVD will not give a high quality result since it has been highly compressed.

2. Light Optimize the content in a video editing program by boosting Brightness and Color Saturation and save the a master file in Photo Jpeg 98%-100% or Animation Non Compressed (best) format.

   Note: The DL.2 and Axon media servers can also provide light optimizing as a visual effect, (see *Content Optimization* ***on page 60).***

3. Import Video master into Encoder/Compressor.
4. Output encoded files to your hard drive.
5. Upload your Custom Content to the DL.2 fixture or Axon media server, (see *Uploading Content from Your Local Drive to a Media Server* on page 167.

   Note: If a file is not DL2 compatible, it may load but not appear as output. The CMA thumbnail view of content will note incompatible files with an X.

Encoder Selection

Cleaner on Mac and **Expert HD** or **TMPGEncoder** on PC for encoding solutions offer good quality and the most reliable DL.2 playback.

Any encoder you use will need to provide options that achieve the following specifications:

- Size to 640x480 pixels
- All I-frames (an I frame every 1 frame) for optimal tracking
- Constant Bit Rate (CBR) data rates of 10 to 12 megabits/sec
- Closed Group of Picture (GOP)
- Sequence headers each GOP (every frame)
- Progressive frames (since it's a progressive display device, not interlaced)

- End of sequence “Sequence Style”

All the encoders have demos and will batch encode (ExpertHD need a small script and a settings file to batch encode).

Note: TMPGEncoder includes filters that let you light optimize in the encoder.

Creating 3-D Objects

In general, any 3-D modeling program can be used to create objects. If the particular 3-D modeler does not export in DirectX .x format, a translation program will be needed to translate the object from the modeler's output format to the DirectX .x format. For example, you can use Newtek's Lightwave 3-D® modeler to generate 3-D objects in .lwo format, and then convert the object to .x format using Deep Exploration from Right Hemisphere.

The following list includes some general notes and tips for creating a custom 3-D object.

- With the control parameters (position, scaling and rotation) set at their default values, a rectangle measuring (13.0m, 9.75m, 0m) will just fill the screen.
- Objects are stored in Microsoft's DirectX .x format. .x files may be stored in either text form or binary form.
- An object can have one layer, one surface and one file texture.
- An object's UV (texture) coordinates should be in the range [0.0,1.0] to insure proper presentation. UV coordinates outside this range will wrap to this range but the results are not predictable.
- All polygons should be triangles. when creating objects, it can be easier to work with polygons that have more than three sides. However, an object should only contain triangles (three-sided polygons) when ultimately saved for use with the graphics engine.
- An object can contain multiple, disconnected subobjects as long as item 4 is followed. An example would be an object composed of an array of disconnected spheres or cubes.

Managing Custom Content

The Content Management Application running on your own computer as a client to DL.2 media servers via Ethernet manages any User Content you create. All Stock and User content can be viewed and refreshed but the CMA client gives you additional control over other aspects of your custom content.

Sections under *Managing User Content* on page 164 in *Chapter 13* describe the User content management functions including instructions on how to:

- Rename files and folders
- Delete files and folders
- Control DMX value assignment to files and folders
- Move files and folders between your local drive and a DL.2 fixture server
- Move files between networked DL.2 fixtures

Appendix C:

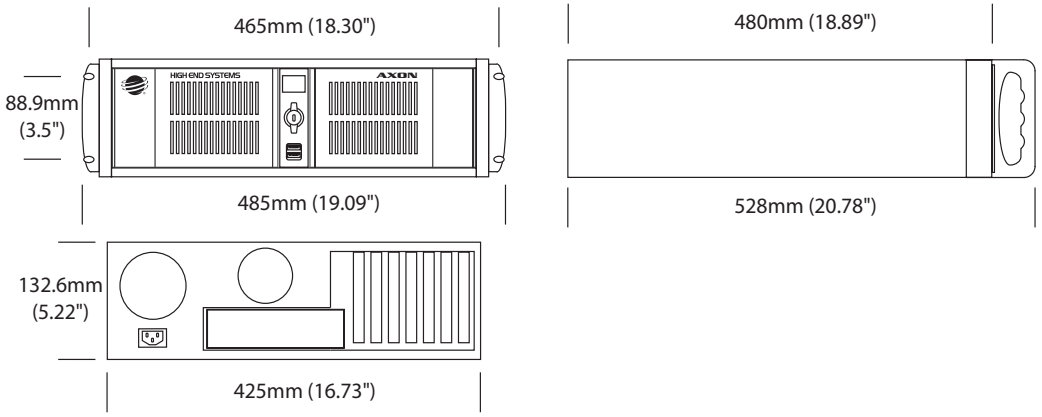
Axon Media Server Specifications

Fixture mechanical, electrical, optical and component specifications are listed.

Mechanical

Fixture Dimensions: 65mm x 89mm x 528mm (18.3in x 3.5in x 20.8in)

Weight: 15 kg (33 lbs)



Computer

Processor: Intel Core2 Duo 2.4 GHz **Video card:** ATI X1900XT

Memory: 2 GB DDR2 RAM

Hard drive: Seagate SATA

Operating System: Windows XP embedded

Local Video Output allows viewing of CMA for Content Management and Configuration editing.

Connection: DVI with VGA Adapter

Operation

Control Options: DMX512, Art-Net

Compliances: CE

Video Connectors: **:** VGA—HD15, DVI, S-Video—mini-DIN

Peripheral/Network Connectors: 6 USB ports, Ethernet

DMX Connectors: 5-pin male and female XLR connectors

Environmental Tolerances: Ambient Operating Temperature Range: 5°–35° C (40°–95° F)
Humidity: 5%–95% (non-condensing)
Altitude: 0–8850 ft (0–2700 m)

Software Upgrades: Download software and upgrades from the High End Systems web site (www.highend.com)

Electrical Specifications

WARNING!
Class 1 equipment – This equipment must be earthed.

Input ratings: 100–120V 7.0A maximum 50/60Hz, 200–240V 3.5A 50/60Hz

Power factor: 0.94

Environmental Specifications

Maximum ambient temperature (Ta): 35° C (95° F)

Cable and Connector Specifications

Video Connectors:

- RGBHV—BNC x 5
- VGA—DB15
- S-Video—mini-DIN

Peripheral/Network Connectors:

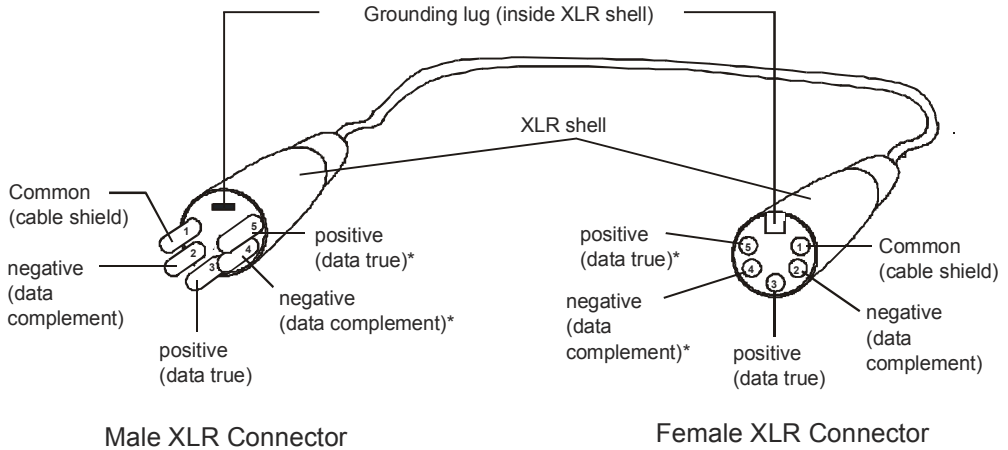
- 6USB ports

DMX and RS-485 Projector Link

Cables: Belden 9841 or equivalent (meets specifications for EIA RS-485 applications) with the following characteristics:

- Two 4-conductor twisted pairs plus a shield
- Maximum capacitance between conductors: 30 pF/ft
- Maximum capacitance between conductor and shield: 55 pF/ft
- Maximum resistance: 20 Ohm/100 ft

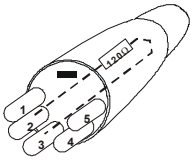
- Nominal impedance: 100–140 Ohm



**This data line is not used by the fixture, but allows data to pass through the fixture.*

Connectors: Two 5-pin male and female XLR connectors:

- Pin 1 Ground
- Pin 2 Data–
- Pin 3 Data+
- Pin 4 Secondary data–
- Pin 5 Secondary data+



Terminator: 5-pin male XLR connector with a 120 Ohm terminating resistor fitted between pins 2 and 3.

Appendix D:

Safety Information

Warning: For Continued Protection Against Fire, this equipment is designed for connection to branch circuit with a maximum overload protection of 20 A.

Warning: For Continued Protection Against Electric Shock

1. If this equipment was received without a line cord plug, attach the appropriate line cord plug according to the following code:
   - brown–live
   - blue–neutral
   - green/yellow–earth
2. As the colours of the cores in the mains lead of this equipment may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:
   - the core which is coloured green and yellow must be connected to the terminal in the plug which is marked with the letter E or by the earth symbol ⏚, or coloured green or green and yellow.
   - the core which is coloured blue must be connected to the terminal which is marked with the letter N or coloured black.
   - the core which is coloured brown must be connected to the terminal which is marked with the letter L or coloured red.
3. Class I equipment. This equipment must be earthed.
4. Equipment suitable for dry locations only. Do not expose this equipment to rain or moisture.
5. Refer servicing to qualified personnel; no user serviceable parts inside.

Appendice D

Importantes Informations Sur La Sécurité

Mise En Garde: Pour Une Protection Permanente Contre Les Incendies: Cet appareil de connection au circuit comporte une protection contre les surcharges de 20 A.

Mise En Garde: Pour Une Protection Permanente Contre Les Chocs Électriques

1. Si cet équipement est livré sans prise de cable, veuillez connecter la prise de cable correcte selon le code suivant:
   - marron - phase
   - bleu - neutre
   - vert/jaune - terre
2. Débrancher le courant avant de changer les lampes ou d'effectuer des réparations.
3. Cet équipement doit être uniquement utilisé dans des endroits secs. Ne pas l'exposer à la pluie ou l'humidité.
4. À l'intérieur de l'équipement il n'y a pas de pièces remplaçables par l' utilisateur. Confiez l'entretien à un personnel qualifié.
5. Equipement de Classe I. Cet équipement doit être mis à la terre.

Anhang D

Wichtige Hinweise Für Ihre Sicherheit

Warnung: Zum Schutz Vor Brandgefahr: Dieses Gerät darf nur an eine Zweigleitung mit einem Überlastungsschutz von höchstens 20 A angeschlossen werden.

Warnung: Zum Schutz Gegen Gefährliche Körperströme

1. Wenn dieses Gerät ohne einen Netzkabelstecker erhalten wurde, ist der entsprechende Netzkabelstecker entsprechend dem folgenden Code anzubringen:
   - Braun - Unter Spannung stehend
   - Blau - Neutral
   - Grün/Gelb - Erde
2. Vor dem Austauschen von Lampen oder vor Wartungsarbeiten stets den Netzstecker ziehen.
3. Diese Geräte sind nur zum Einbau in trockenen Lagen bestimmt und müssen vor Regen und Feuchtigkeit geschützt werden.
4. Servicearbeiten sollten nur von Fachpersonal ausgeführt werden. Das Gerät enthält keine wartungsbedürftigen Teile.
5. Dieses Gerät gehört zur Klasse I. Dieses Gerät muß geerdet werden.

Apéndice D

Información Importante De Seguridad

Advertencia: Para Protección Continua Contra Incendios: Este equipo debe conectarse a un circuito que tenga una protección máxima contra una sobrecargas de 20 A.

Advertencia: Para La Protección Continua Contra Electrocuciones

1. Si se recibió este equipo sin el conector de alimentacion, monte usted el conector correcto según ia clave siguente:
   - moreno - vivo
   - azul - neutral
   - verde/amarillo - tierra
2. Desconecte el suministro de energía antes de cambiar lámparas o prestar servicio de reparación.
3. Este equipo esta disenado para usarce en lugares secos no lo exponga a la lluvia o humedad.
4. Derive el servicio de reparación de este equipo al personal calificado. El interior no contiene repuestos que puedan ser reparados por el usuario.
5. Equipo de Clase I. Este equipo debe conectarse a tierra.

Appendice D

Importanti Informazioni Di Sicurezza

Avvertenza: Per Prevenire Incendi: Questa apparecchiatura e' da collegarsi ad un circuito con una protezione da sovraccarico massima di 20 ampere.

Avvertenza: Per Prevenire Le Scosse Elettriche

1. Da non montare sopra una superficie infiammabile.
2. Mantenere l' apparecchio a un minimo di 1.0 metri (3.28 piedi) di distanza dai materiali combustibili.
3. Sostituire i fusibili usando soltanto quelli del tipo e della taratura adatta.
4. Mantenere una distanza minima di 1.0 metri (3.28 piedi) dagli oggetti accesi.
5. Questa apparecchiatura e' da collegarsi ad un circuito con una protezione da sovraccarico massima di 20 ampere.

Vigtig Sikkerhedsinformation

Advarsel: Beskyttelse mod elektrisk chock.

VIGTIGT! LEDEREN MED GUL/GROEN ISOLATION MAA KUN TILSLUTTES KLEMME MAERKET ⏚ ELLER ⏚.